

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

JUNE 15, 1997

EIGHT DOLLARS

BELGIUM BF240

FRANCE FR40

GERMANY DM12

ITALY L13,000

JAPAN ¥780

NETHERLANDS G13

SPAIN P1000

SWITZERLAND SFR10

UNITED KINGDOM £5

SPECIAL REPORT

Under The Knife

Can IT Keep
Health Care Off
Life Support?

PAGE 42

Sentara Health's
Bert Reese
mines patient
data to identify
best practices

ALSO INSIDE

IS Meets HR

PAGE 30

EC Supply
Chains

PAGE 70

AN INTERNATIONAL DATA GROUP PUBLICATION



the
“there’s got
to be some
money hiding
around here
somewhere”
solution

Are you sitting on assets that could be making money? Do you have a database with a market that you’ve never even considered? An IBM Internet solution can change all that.

Take, for example. **Knight-Ridder™**

Information’s research library with over 1.5 million titles. We helped satisfy their customers’ information needs, worldwide, by offering them this resource over the Internet. Demand is so great, they project a tenfold increase in revenue.

That’s the power you get with an IBM Internet solution, a unique combination of technology, professional services and know-how that’s enabling a world of e-business opportunities.

Learn how to **maximize your assets using the Internet.**

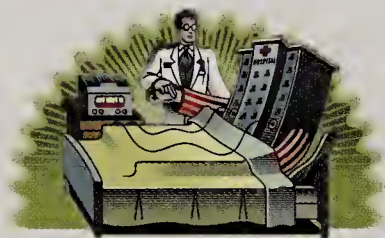
Just drop by www.ibm.com/internetsolutions, or give us a call at 1 800 IBM-7080, ext. NC06, for our free brochure on commerce solutions.



Solutions for a small planet™

Inside CIO

VOLUME 10 • NUMBER 17 • JUNE 15, 1997



SPECIAL REPORT Health Care

OVERVIEW

42 Medical Exam

This special report on the health-care industry looks at how providers are relying on IT to help them survive.

By Jennifer Bresnahan

DATA MINING

44 A Delicate Operation

The experiences of those in the business of curing patients could help you come up with a prescription for a healthier business.

By Jennifer Bresnahan

INFORMATION INFRASTRUCTURE

58 Managed Share Networks

Here's how three health-care organizations are overcoming the obstacles to effective information sharing.

By Tom Field

Features

ELECTRONIC COMMERCE

70 EC Riders

How can you streamline your supply chain to include business partners? Just use your Web.

By Peter Fabris

STORY INDEX

82 Six Months in Review

An index of all major articles published in *CIO* in the first six months of 1997, including a cross-reference by article type.



In Every Issue



IN BOX 8

Letter from the editor, reader feedback, how to reach us

16/ Publisher's Note

TRENDLINES 20

22/ Can't Find Help? You're Not Alone.

The IT hiring crunch

26/ Small World, Big Plans

A Disney health-care celebration

28/ Reader Snapshot

Sentara Health's Bert Reese

PLUS/ Salaries in the IT industry, electronic house calls, cyber pets, preventing repetitive stress injuries, helping the help desk

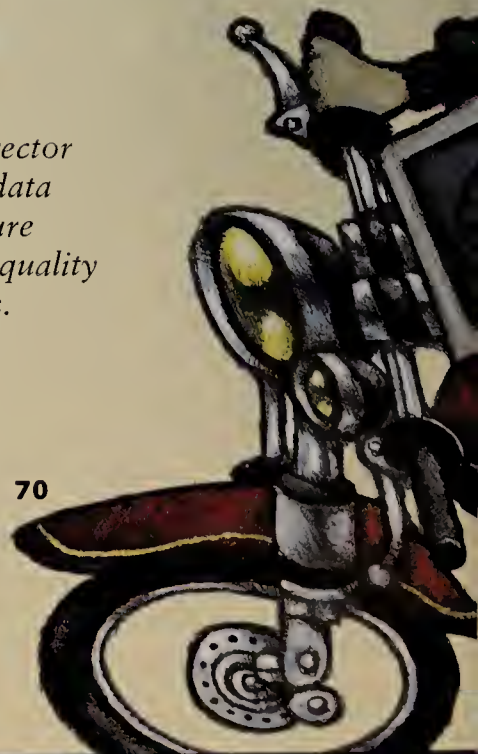


INDEX 108

44 Corporate IS Director
Bert Reese used data mining to help cure Sentara Health's quality and efficiency ills. Cover photo by George Simian



70



Our Software Secures More Corporate Data Than All Our Competitors Combined.



More clients — including 462 of the Fortune 500 — trust CA security software than all the partial, proprietary solutions offered by IBM/Tivoli, Platinum and Boole & Babbage.

CA Security Software Is #1.

CA holds more security "firsts" than any other vendor. CA was the first to secure IBM's DB2 platform (two years before IBM). CA was the first to identify and address all the security risks of

UNIX and NT. And with the introduction of ICE (Internet Commerce Enabled™), CA is the first to make it safe to do business on the Internet.

Unicenter TNG Is The Industry Standard For Network And Systems Management.

Unicenter® TNG™ offers the only integrated solution for true end-to-end enterprise management. With support for every major hardware platform and operating system, Unicenter TNG is open, scalable, extensible and 100% vendor-neutral. In addition, Unicenter TNG offers all kinds of powerful and

exciting new features like a real-world, 3-D interface with virtual reality, Business Process Views™ and advanced agent technology.

No other management software offers anything like it.

Single Sign-On lets users use one password and sign on once for every platform.

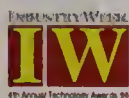
The Best Feature Of All Is Unicenter TNG Is Shipping Today.

While our competitors are talking about a framework for the "future," Unicenter TNG is a proven software solution that's available today. It's real, it's mission-critical and it's up and running in thousands of sites around the world for some of the smartest clients in the world.

Our clients sleep soundly every night knowing that all their IT assets are safely protected by the best security software in the world. Shouldn't you?

**For More Information Call
1-888-864-2368
Or Visit www.cai.com**

**COMPUTER[®]
ASSOCIATES**
Software superior by design.



Unicenter[®] TNG[™]

©1997 Computer Associates International, Inc. Islandia, NY 11788-7000. All other product names referenced herein are trademarks of their respective companies

IN THE NEXT FEW
YEARS, TV, CABLE,
THE PHONE SYSTEM
AND THE INTERNET
WILL ALL BECOME ONE.

WILL YOU KNOW
HOW TO PLAY?

They certainly will. They'll be as comfortable in front of a computer workstation as you are in front of a TV set. Only they'll get a lot more out of it. It'll be their fax, their phone, their interactive television, their library, their secretary, their teacher, their partner. Not to mention their on-camera, on-line, interoffice meeting place.

It's the way society will operate; it's the way companies will network; it's the way business will grow.

Let's get ready for it. We're Bellcore.
The people who've already built the foundation for the world's most sophisticated Telecom network. And who've been living and breathing the future of business networking ever since. Let's talk. Let's plan. Let's make sure that when somebody says, *tag, you're it* you'll be ready to play and win.

1-800-521-CORE (U.S. & CANADA)
<http://www.bellcore.com>

Bellcore





BELLCORE
AND YOU.
THE FUTURE IS
WHAT WE MAKE IT.

Inside CIO

CONTINUED

Columns

EXECUTIVE COUNSEL

30 **Cutting Deals with HR**

Paying staff what they're worth means selling HR.

By Christopher Koch

THINK TANK

34 **Known Evils**

Common pitfalls of knowledge management.

By Tom Davenport

IDC VIEW

92 **The Sky Is Not Falling**

Stocking up on canned goods and shotguns may not be the best strategy for confronting the year 2000 problem.

By Thomas D. Oleson

EMERGING TECHNOLOGY

98 **The Smallest Systems**

Scoping out the future of palmtops in the enterprise.

By Curtis F. Franklin Jr.

- E-mail management
- Optical-disk storage, network security, remote desktop access

SHOP TALK

110 **Penn Mutual's Susan Kozik**

A CTO talks about enterprisewide customer service.

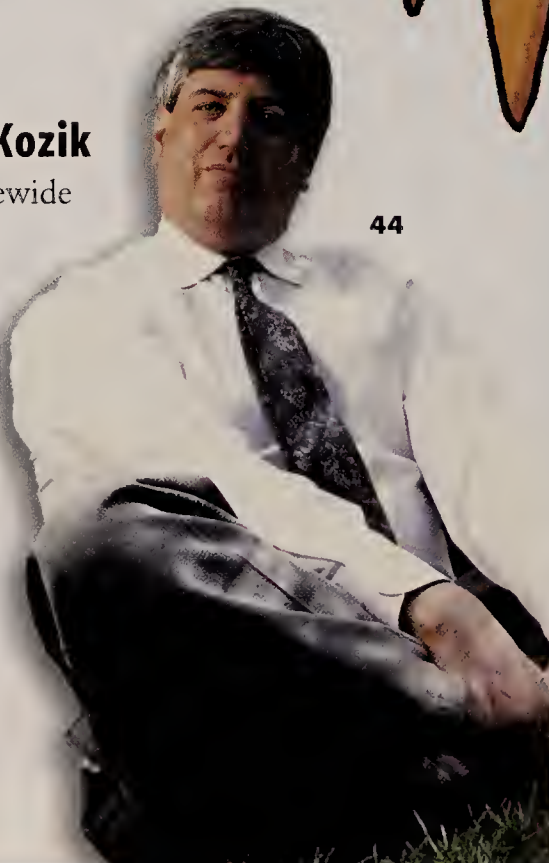
By Elaine M. Cummings



110



98



44

New On Our Web Site

cio.com

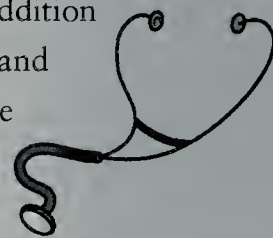
<http://www.cio.com>

I.T. HEALTH CENTER

Visit CIO's **Health-Care Resource Center**

to learn more about the issues facing health-care CIOs. In addition to industry overviews and profiles of leading-edge providers, the site will offer links and resources that shed light on the major trends emerging in the health-care industry.

www.cio.com/forums/healthcare/



FORUMS, RESOURCES AND MORE

Want to learn more about electronic commerce? Do you know all there is to know about the webmaster's role? What's your knowledge of ROI from the Web? You can find that information and more through our **Online Forums** and **Resource Centers**. Other topics include government, intranets and data warehousing. You'll also discover forums on the year 2000 and SAP R/3 enterprise software.

www.cio.com/forums

IDG
INTERNATIONAL DATA GROUP

Board Chairman

PATRICK J. MCGOVERN

President

KELLY CONLIN

Chief Operating Officer

JAMES CASELLA

Executive Vice President

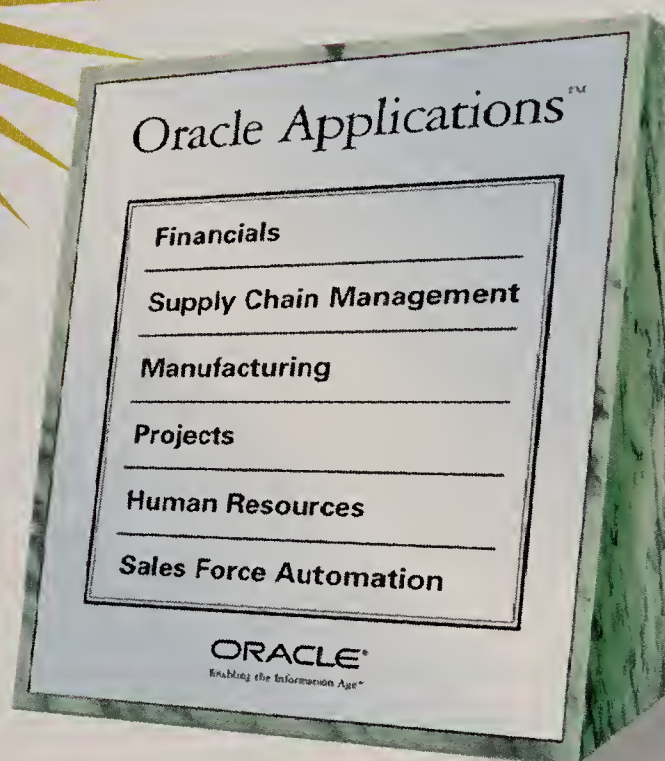
WILLIAM P. MURPHY

Oracle Applications Rated #1

Datamation

1997
Product
of the **Year**

IS MANAGERS' CHOICE



Oracle Applications™ swept away the competition, winning Datamation's Product of the Year for Packaged Applications. Runners up include PeopleSoft and SAP R/3. Today's leading IS managers agree that Oracle delivers the best applications solutions. Oracle Applications are the only packaged applications that combine global, rich functionality with state-of-the-art technology, enabling rapid implementation. For more information, call Oracle at 1-800-633-1059, ext. 11598. Or find us on the Web at <http://www.oracle.com/products/applications/>

ORACLE®
Enabling the Information Age™

REGISTER NOW.

www.oracle.com/openworld

ORACLE OPENWORLD USER AND DEVELOPER CONFERENCE
SEPTEMBER 21 - 26 • LOS ANGELES, CA • 800.304.4664

© 1997 Oracle Corporation. All rights reserved. Oracle is a registered trademark, and Oracle Applications and Enabling the Information Age are trademarks of Oracle Corporation. All other company and product names are the trademarks of their respective owners.

In Box

LETTER FROM THE EDITOR, READER FEEDBACK AND HOW TO REACH US

Last month's cover story reported on the ethics of using customer data for commercial purposes. The main stories in this issue of *CIO* center on the use of information in health care. If there's any industry (and don't you just hate the fact that health care has become an industry?) that must wrestle with the ethical issues of information use, it's this one.

My father's a retired surgeon. When he stopped practicing medicine just over 10 years ago, he was relieved that he would not have to go through the cataclysmic changes facing health-care providers at the time—and new diagnostic tools and surgical techniques were just the tip of the iceberg.

The big question today is, "Who's making the decisions about what treatments people receive, and what is the basis for making those decisions?" Even when people talk about quality of care, much of their concern is driven by cost considerations: If doctors make the right decisions, they will order fewer unnecessary (and costly) tests, patients will require shorter hospital stays and so on. Sure, these things are often good for the patient too, but health-care providers and administrators must keep a vigilant eye on the drivers for the decisions they make.

Motivation matters. Under good conditions, concern over health and concern over costs may put you on the same path. But when times get tough, the interests of the dominant driver will win out. In this arena, cost most definitely should not be king. And today, it's gained way too much ascendance. The people paying the bills (insurance companies and health-care administration organizations such as HMOs) are focusing their investments on systems to control costs, not necessarily to improve outcomes for the benefit of patients, according to some in the industry.

"A lot of payers say they want outcomes information, but at the bottom line, clinical outcomes analysis capability is secondary and may or may not be paid for," says William C. Reed, senior vice president and chief information and administrative officer for home health organization Olsten Health Services. "Cost is still the number-one driver," he says. (See "A Delicate Operation" by Staff Writer Jennifer Bresnahan on Page 44.)

Health is an incredibly sensitive and charged subject. Managers in other industries who are beginning to mine consumer data would do well to watch how health-care providers address such issues as privacy, access to data and use of patient identifiers. Perhaps more importantly, they should search their own souls for the real drivers behind their use of customer data and make sure they have their priorities straight.



Allie Lundberg
lundberg@cio.com

*Other
Year 2000
vendors*



Peritus



OUR COMPETITORS ARE SUFFERING FROM TOOL ENVY.

Go ahead. Compare Year 2000 solutions. You'll find out one company exceeds all others in power, performance and flexibility.

Peritus. We are the proven standard in Year 2000 conversion solutions.

Only Peritus offers a full suite of alternatives to fit your specific Year 2000 requirements, from data expansion to logic correction. So whether your system is mission critical or at the end of its life cycle, you can choose a solution that's tailored to your specific needs. Maybe that's why more leading companies and top service providers around the world are currently using Peritus as their Year 2000 partner.

There's something else you get from Peritus—peace of mind from partnering with the world's leader in creatively managing the installed software base. Our Year 2000 solutions are just part of the value Peritus can bring to your company. And we're revolutionizing the way people think about software. Don't be envious. Be smart. Call Peritus today at 1-800-598-7787 for more information, or visit us at www.peritus.com.

Peritus®

CREATIVE EXCELLENCE IN SOFTWARE EVOLUTION

In Box

THE TROUBLE WITH OUTSOURCING

In response to your questions [in the April 1, 1997, editor's letter]: "Where do you stand with outsourcing? Is there anything you wouldn't put out to contract?" In a nutshell, I believe outsourcing in many instances is a grave mistake. I myself [work for an outsourcer] and have for some time.

I believe in people. I don't believe technology plays a bigger role in the ultimate, long-term success of a company—any company—than the people behind it do. It's hard to have a sense of being bound to the goals of a company when you're not truly a part of that company. From experience, I've found that organizations that offer their employees a sense of ownership often break records in their respective fields.

The company that I currently [work for] takes about half of what the company I am on contract to is forking out. I have no benefits. There's really no sense of loyalty. I may get the job done, but perhaps I could accomplish more, in less time, if I felt a sense of loyalty to the company I [am contracted to]. I'm exceptionally well-rounded in my skills, and I believe most people who go from project to project or job to job possess this attribute. As a network administrator, I have to ensure the stable transactions of data, back up that data and set up connectivity to it. Why a company would outsource such critical elements of a business is beyond me (especially in my field).

I'm currently taking measures to outsource myself to organizations and skip the outsourcing company altogether. That is something I'd like to see more people do. Why have 10, 15 or 20 bucks an hour chopped off your pay by a bunch of people who do little more than take phone calls and mail you a check when you can outsource yourself?

Roger Koon

rkoon@concentric.net

SHOW ME THE MONEY

On Page 22 of the March 15, 1997, issue, a chart titled "Finding Job Satisfaction" shows that people who love their jobs earn at least 10 percent

more than those who don't. Your commentary on this is, "Surprise! The more IS executives are paid, the more satisfied they are with their jobs." I would argue, as does most research on job satisfaction, that the reverse is true. The more IS executives love their jobs, the more they are paid.

Not that compensation isn't important, but it's certainly not the primary contributor to job satisfaction. Perhaps the writer of the commentary is looking for a pay increase?

Dennis Dwyer

*Vice President, Technology Facilitation
Harris Trust and Savings Bank
Chicago*

Dennis.Dwyer@harrisbank.com

PUT OFF BY PAPER

Consider the idea that the people your magazine reaches are no longer interested in or have the time to be seduced by slick sidebars and leading extracts. Your online version invariably contains the full text of what every editor thinks but frequently omits the text of the important articles.

I receive a hard copy of your magazine but would much prefer to view it online and forget the paper copy. I have started patronizing sponsors found in online advertisements versus those in print in all of the literature that I view.

Leif J. Lauritzen

*Chairman
SPA Inc.
Simi Valley, Calif.
leifone@worldnet.att.net*

Full text versions of features and major articles from issues of CIO are available on our Web site dating back to September 1994. We publish substantial excerpts from our current issue the day the print version comes out, which you can read by visiting www.cio.com and clicking on the picture of the desired CIO issue. Two weeks after publication, we put the full text of the articles online—just visit www.cio.com/CIO/ and click on any Inner Circle link (you must register for this free service). Back issues reside there as well, and the archive is searchable.



© CIO Communications, Inc.

President and Group Publisher Joseph L. Levy
Editorial Director Lew McCreary

EDITORIAL

Editor in Chief Abbie Lundberg
Managing Editor Richard Pastore
Senior Editors Carol Hildebrand, Christopher Koch
Associate Editors Elaine M. Cummings,
Cheryl Dahle, Alice Dragoon, Perry Glasser, Sara Shay
Associate Editor, Web and Print Megan Santosus
Copy Chief Cheryl R. Asselin
Copy Editor Heath Row
Staff Writers Jennifer Bresnahan, Peter Fabris,
Tom Field, Derek Slater
Editorial Researcher Carol Zarrow
Editorial Assistants
Ruth Greenberg, Thomas G. Wailgum
Administrative Assistant Lisa Jayne Kerber

Contributing Editors Katherine Auer, Leigh
Buchanan, Laura Farrell, Art Jahnke, Anne Stuart
Contributing Writers
Thomas H. Davenport, John Edwards,
Curtis F. Franklin Jr., Thomas D. Oleson

DESIGN

Group Director, Art and Design Mary Lester Marshall
Sr. Graphic Designers Hana Barker, Linda Golon,
Michael Siggins
Graphic Designer Steve Traynor
Associate Graphic Designer Terri Mitchell
Contributing Art Director Lisa Puccio

WEB SITE

VP / Technology and Webmaster Tim Horgan
Web Developer Lee Weiner
Web Intern Dagmar Eiben

CIRCULATION

VP / Circulation Carol A. Spach
Fulfillment Manager Susan Woodworth
Subscription Svcs. Manager Denise Perreault
Circulation Assistant Tina Pescara

PRODUCTION

VP / Production Lori Beth Sadewitz
Production Manager Resa Altsher
Ad Traffic Coordinator Lynne Zouranjian

EXECUTIVE PROGRAMS

Senior VP / Exec. Programs Lynda Rosenthal
Director, Program Planning Susan T. Montgomery
Manager, Program Development Robin L. Azar
Manager, Program Operations Cynthia Laird
Mgr., Program Mktg. Comm. Sara E. McGarry
Program Mktg. Coordinator Jeremy E. Draper
Administrators, Exec. Programs
Liz Hecht, Michael McPhee
Administrative Assistant Sandra J. Hughey
Program Coordinator Brian Fuce
Data Coordinator Heather Beaton
Manager, Ancillary Products Bill Kerber

MARKETING

VP / Marketing Cathy O'Leary Hayes
Director, Marketing Programs Lisa Brown
Director, Public Relations Susan Watson
Research Manager Bridget Cammarata
Marketing Comm. Manager Marcy L. Dill
Trade Show Coordinator Dot Caspersen
Research Specialist Caroline Cerullo
Marketing Comm. Specialist Karen Fogarty

ADMINISTRATION

VP / Finance & Admin. Walter Manninen
Assistant to the Publisher Diane Martin
Office Specialist Cara Kelley
Billing Coordinator Lynn J. Palmquist
Financial Analyst Chad Marston
Accounting Specialist Kerry Grady

INFORMATION SYSTEMS

Chief Information Officer Bruce M. Friedman
Manager, Desktop Services James C. Burgoyne



HERE'S THE ANSWER. WHAT'S THE QUESTION?

Since the way you use your network has changed dramatically, now is an excellent time to question its conventional design. Put simply, your rigid system isn't equipped to handle the fluid movement of intranet traffic, Internet access, and new applications that take advantage of both. Enter Adaptive Networking.

cornerstone technologies: Access, Switching, IP Services, and Network Management.

Q • WHAT ABOUT RELIABILITY?
When your network goes down, so does productivity. Not to worry. Adaptive networks are inherently more

provides the powerful ability to visualize and analyze real-time traffic flow across your entire network. Intelligent agents monitor your network infrastructure, keeping your IT staff informed of changing conditions and often making adjustments as needed. What's more, Optivity includes analytical tools for capacity planning to help reduce budget surprises.

Q • WILL IT WORK WITH WHAT I'VE ALREADY GOT?
Of course. It wouldn't be truly adaptive if it didn't. You can adopt this technology at your own pace in cost-justifiable increments. Adaptive Networking even makes our competitors' products smarter and faster. Good news, since you probably already own some.

Q • CAN IT GIVE MY BUSINESS A COMPETITIVE EDGE?
Definitely. You can offer hot, new services and build closer links with customers and business partners. Should they need access to your corporate network from the Internet, you can offer secure virtual private network connections. Want to add voice-over-IP capabilities to link customers and service representatives from your Web site and reduce long-distance phone costs? Adaptive networks can do this and much more.

Q • WILL IT WORK WITH THE LATEST APPLICATIONS?
Applications drive your network needs. That's why adaptive networks shift on the fly to match routing priorities to your applications. For example, financial transactions and video conferencing can take routing priority over e-mail packets and Web browsing.

ANY QUESTIONS?

If your network can't do all of this, it's time to start asking a few questions of your own. For a free strategy paper, visit www.baynetworks.com/adapt/a10 or call 1-800-8-BAYNET ext. 304. Adaptive Networking is exactly what your business needs. Without question.

Adaptive Networking

Q • ALL RIGHT, WHAT IS IT?
Adaptive Networking is a set of products and cornerstone technologies that transition today's networks to the IP-optimized networks of tomorrow. The aim of Adaptive Networking is to build networks that are invisible to users, worry-free for network managers, and strategic for the business.

Q • WHAT DOES IT OFFER?
Our philosophy is centered around more services with less complexity. How? Through transparent scalable technologies that ensure long-term, non-disruptive network evolution; drive operational productivity at every level of the organization; and adapt to changes in network usage and business requirements.

Q • WHAT ARE THOSE SCALABLE TECHNOLOGIES?
Bay Networks products are being developed around industry-leading

reliable and scalable thanks to symmetric multiprocessing and a distributed architecture. In other words, there's no single point of failure to bring down your network. Moreover, the system automatically reroutes traffic as needed to avoid bottlenecks. And you can easily add to, change, and modify your network without disrupting users.

Q • HOW CAN I REDUCE NETWORK OWNERSHIP COSTS?
Adaptive networks automatically find and configure new devices to save your IT staff considerable time. And thanks to our Autosensing Technology, the system determines which users have 10Mbps or 100Mbps capabilities, for example, and matches them with the bandwidth they need.

Q • HOW CAN WE AVOID SURPRISES?
With Optivity®, your IT staff can proactively manage all the devices in your network as one cohesive system—even if it extends across the Internet. Optivity also



Bay Networks

You sit here.

You manage the PCs here.



HP Vectra VE
for Business FROM \$992†

Next time you're thinking about choosing
a business PC, consider: instead of running
around and locating each and every
PC in your network, you can save your

breath by using the HP Vectra V and X Series PCs. Our
Intel® Pentium® processor-based PCs are designed not
just to be manageable, but to actually help you manage.

Between our hardware and software features like
TopTOOLS and OpenView, we offer a host of non-

proprietary, DMI-standards-based management



solutions. You can remotely monitor and upgrade the BIOS
of multiple PCs throughout your entire network,* collect
asset data from them, troubleshoot problems before they
even become problems and, in general, get more work done.

Have a seat and please type: *www.hp.com/go/vectracommercial*

Better products, better productivity.

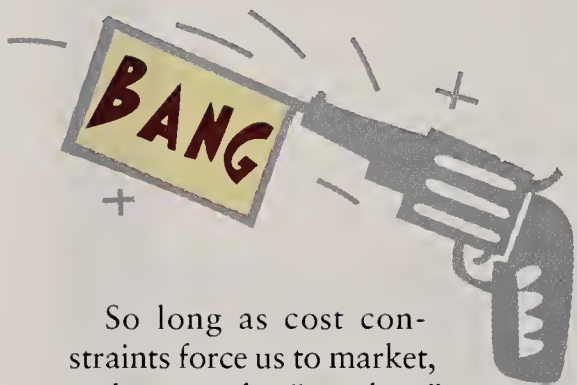


In Box

DODGING THE BULLET

[In response to your March 15, 1997, editor's letter,] looking back more than 15 years, we didn't know squat about building bulletproof applications. In fact, if the term "squat zero" had been invented back then, we wouldn't have known even that much.

I think there are some analogies. At one auto manufacturer, quality may be job number one, but the cars still break down. Light bulbs still burn out. And, word processors with spell checkers, well....



So long as cost constraints force us to market, so long as the "product" continues to change and change continues to quicken, and most certainly, so long as quality marketing has more impact on the consumer than product quality—we can't build bulletproof [applications]. We only can hope to dodge the next bullet.

Kermit Jensen

Systems Manager

Portfolio Financial Services

Portland, Ore.

kjensen@parrish-financial.com

CEO OR SEE YOU LATER

[In response to your May 1, 1997, editor's letter,] deciding whether to have a CIO report directly to the CEO or whether a CFO, or even a COO, should act as a middleman requires asking the following questions:

1. Can a CFO or COO adequately represent the interests of an information technology organization to the CEO and senior staff or show how technology can be used to solve business problems? If not, the CIO should be part of the senior management team and directly report to the CEO.
2. Does the CEO perceive information technology to be a strategic weapon or a means to an end? If the CEO does not view IT as strategic, then chances

How to Reach Us

E-mail: letters@cio.com

Phone: 508 872-0080

Fax: 508 879-7784

Address: CIO Communications Inc.,
492 Old Connecticut Path, P.O. Box 9208,
Framingham, MA 01701-9208

Web Site: www.cio.com

Subscriber Services: 800 788-4605,

Fax: 508 879-7899;

E-mail: denisep@cio.com

Reprints: Reprints are available by
calling 508 935-4539

are the CIO will report to a CFO or COO. That is not necessarily bad if there is enough synergy between the CIO and CFO/COO and their goals are congruous. If the CEO views IT as strategic, chances are the CIO will be at his or her side.

I have had the luxury of directly reporting to the CEO of the companies

I have worked for in a CIO capacity and have been successful in selling technology as a part of corporate strategic and tactical plans. The one time I reported to a CFO, I spent more time defending costs than concentrating on strategy. I left that company after only one year and, lo and behold, it is no longer a profitable company. Its customers left because the CEO and marketing sold to customers more than the company could deliver (through systems and automation), and many customers defected to competitors.

When I speak with executive search firms about CIO opportunities, one of the first questions I ask is, "How does the CIO fit into senior management of the hiring company?" If the CIO reports to someone other than the CEO, I say thank you and hang up.

Bradford S. Kerr

Senior Vice President and CIO

Pioneer Financial Services Inc.

Schaumburg, Ill.

Brad_Kerr@pfsgroup.com

Canny Resemblance



Brad Stout
CIO, Thiokol Corp.



Joe Levy
Publisher, CIO



I just received my May 1, 1997, issue. I must comment that while CIO has always been among the very best at reflecting the interests and personalities of its readers, publisher Joe Levy has taken this too far!

Keep up the good work!

Steve Guengerich

President

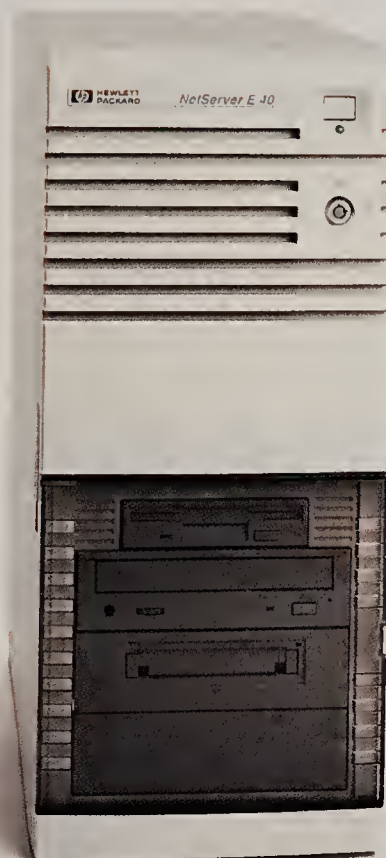
Digital Business Group

Austin, Texas

sguenger@aol.com



PENTIUM PRO
PROCESSOR



The new HP NetServer E 40

Easy installation

Reliability: Standard ECC memory and Automatic Server Restart

NOS certified (Netware, SCO, Windows® NT)

Easy manageability through HP Support Anywhere

Intel® Pentium® Pro processors—180 and 200 MHz

FROM **\$2,159***

Hey, if this isn't a PC, why is it priced like one?

Easy to afford and now easy to find at: www.hpresource.com/e_series-10

*\$2,159 is the projected U.S. street price. Windows NT is a U.S. registered trademark of Microsoft Corporation. Intel Inside and Pentium Pro are registered trademarks of Intel Corporation. ©1997 Hewlett-Packard Company PPG447

 **HEWLETT
PACKARD**

Publisher's Note

"Information has become the most valuable commodity in health care."

—Jeffrey Bauer

President

*The Bauer Group Inc.
Hillrose, Colo.*

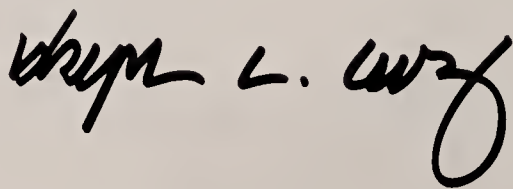
Miracle. Tragedy. Hero. Villain. When you think of life-and-death situations, those are probably the first words that pop into your head. Not "information technology" and certainly not "data mining." But information

technology actually is saving lives, by improving the way doctors practice medicine. Through data mining, they have access to a wealth of information to use in diagnosing patients, selecting the best treatments and evaluating the quality of services.

But does having more information really save lives? In many cases, yes. At Sentara Health System in Norfolk, Va., data mining enabled the quality team to identify a lab-service problem, rectify the situation with a new system and, consequently, decrease the pneumonia mortality rate from 12 percent to 9 percent. Data mining can save money, too, by helping physicians identify the treatments that statistically are the most effective and least

expensive. And information extracted through data mining also can be used to evaluate doctors and facilities, detect fraud and cross-sell and market new products and services. All of those functions benefit health organizations and ultimately improve the level of care they provide.

Sound like a dream come true? Well, not exactly. Like everything else, there is a catch: With that wealth of information come the issues of security and patient confidentiality. Furthermore, doctors need to buy in to the system before it can be used to its fullest potential. And will data mining detract from individualized care and case-by-case diagnoses? Staff Writer Jennifer Bresnahan's article, "A Delicate Operation," on Page 44 explores how CIOs are grappling with those issues.



P.S. CIO Communications has just released a new "best practices" report on Internet policy making. "Maximizing The Internet: Policies, Procedures & Best Practices" explores the formal (and informal) policy choices companies are making to benefit from the Internet's vast resources, while maintaining acceptable levels of security, productivity and efficiency. This information-rich resource is available to CIO readers for \$395. For more information, call Denise Perreault at 508 935-4443 or visit our Web site at www.cio.com/CIO.

PHOTO BY WEBB CHAPPELL

CIO SALES OFFICES

President and Group Publisher

JOSEPH L. LEVY
508 935-4601

Senior VP/Sales

MICHAEL J. MASTERS
973 244-5510

EAST COAST

Regional Director/Advertising Sales

FRANK S. GENOVESE
973 244-5505

District Manager/Advertising Sales

EILEEN P. LOBAUGH
973 244-5507

Advertising Sales Associate

STACY G. GREIMEL
973 244-5519

Advertising Sales Associate

JOAN BONADEO
973 244-5511

Advertising Sales Associate

JANET B. LILOIA
973 227-1140, FAX 973 227-1565

NEW ENGLAND

Regional Manager/Advertising Sales

LEN GANZ
508 935-4039

Advertising Sales Associate

TIM LEONARD
508 935-4092, FAX 508 872-0618

SOUTH CENTRAL

Regional Manager/Advertising Sales

ROBERT E. SAWDON

Advertising Sales Associate

SOUNTHALY OUTHAVONG
512 306-9801, FAX 512 306-9805

NORTH CENTRAL

Regional Manager/Advertising Sales

KEITH H. KENNER
847 441-3143

Advertising Sales Associate

ANNE SWARTZ
847 441-5005, FAX 847 441-5150

WEST COAST

Regional Director/Advertising Sales

GERALD E. PARSONS
415 693-1987

Regional Manager/Advertising Sales

RICHARD BASTAS
415 693-1988

Regional Manager/Advertising Sales

JAMES BARRETT
415 693-1995

Advertising Sales Associate

JODY J. NAGY
415 693-1993

Advertising Sales Assistant

HEATHER O'CONNOR
415 398-8200, FAX 415 398-4649

LIST SERVICES

List Services Manager

STEPHANIE LEGELIS
508 935-4433

List Services Coordinator

KATHRYN A.W. GRAYSON
508 935-4072

List Services Assistant

AMY McCABE
508 935-4151
800 859-5478, FAX 508 872-8506

For further sales information,
visit our Web site at

www.cio.com/marketing/salesoffices.html

I want to publish live, dynamic data on my corporate web.

☐ Send me more information on WebFOCUS ☐ Please have marketing rep call

☐ We will be evaluating new web technology over the next

☐ 1-3 months ☐ 3-9 months ☐ 9-12 months ☐ No plans to evaluate

Has budget been allocated? ☐ Yes ☐ No

NAME _____ TITLE/DEPT. _____

COMPANY _____ TELEPHONE() _____

ADDRESS _____

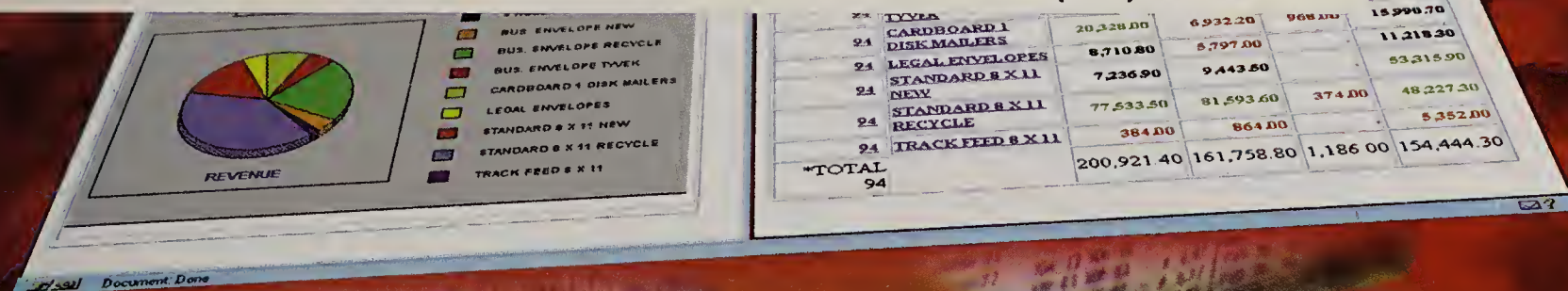
CITY _____ STATE _____ ZIP _____

CALL THE BUILDERS

**Information
Builders**

**www.ibi.com
(800) 969-INFO**

CIO61597



Use your corporate Web to publish live data ...not static pages!

Create Reports From Live Data!

Do you want to deploy serious information systems on your corporate intranet?

Then give users access to live data...not static pages. How? With WebFOCUS, the ultimate data publishing system for the corporate Web.

With WebFOCUS you can:

- Publish live data from virtually any database on any computer platform
- Join and aggregate files from multiple databases on heterogeneous platforms
- Display fully formatted and styled reports with no more than a standard Web browser on the desktop
- Launch simple queries or create sophisticated ad hoc reports from your Web browser
- Automatically create dynamic hyperlinks so users can drill down on reports for more detailed information

World Leader In Enterprise Reporting

WebFOCUS is designed and supported by Information Builders, a world leader in enterprise reporting and analysis systems for more than 15 years.

Take a Test Drive!

For more information and a live demonstration of WebFOCUS, visit our Web site or call our toll-free number listed below.

CALL THE BUILDERS

**Information
Builders®**

In Canada call (416) 364-2760

FOCUS and WebFOCUS are trademarks of Information Builders, Inc. New York, NY (212) 736-4433 E-mail: info@ibi.com

**www.ibi.com
(800) 969-INFO**

How long will it take before you with their credit

{ Imagine if it

The impact on your business would be enormous. The ROI nearly immediate. But the revenues generated from secure credit card transactions are just the beginning. Suddenly you're able to share confidential information over the Internet with your customers, employees, and business partners. Your business becomes more efficient and competitive.

So what does it take to begin? A partner who truly understands the impact networking can have on your business, and knows how to implement it down to the last strand of wire and the

**your customers finally trust
cards over the Internet?
happened next month. }**

©1997 Cisco Systems, Inc. All rights reserved.

last packet of data. We're that partner. Our technologies made the Internet a global reality. Today, Cisco networking products and Cisco IOS™ software are making the Internet safe for secure business transactions of all kinds. Call us at 1-800-778-3632, ext. 192000.

Or visit our Web site at www.cisco.com

After all, there's no reason to keep your customers waiting.

The network works. No excuses.™

CISCO SYSTEMS



Trendlines

NEWS, INSIGHT, HUMOR, REVIEWS

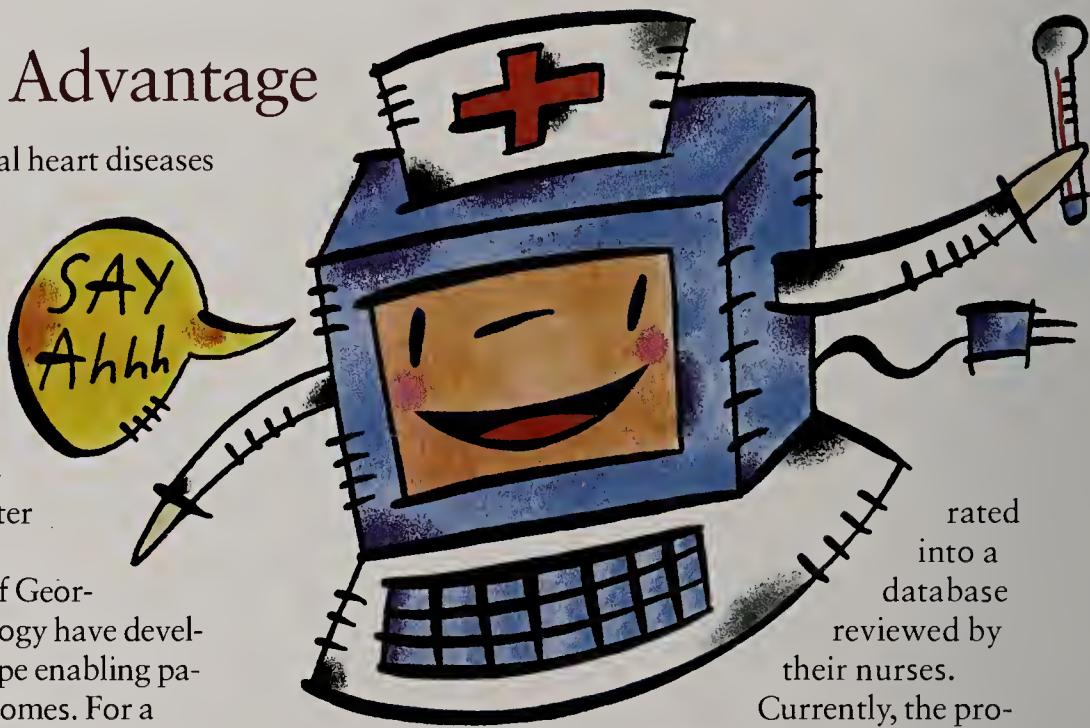
Edited by Katherine Auer

The Home-Screen Advantage

ELECTRONIC HOUSE CALL Congenital heart diseases and other chronic health problems are never something to cheer about. But now, at least, people who require frequent care may no longer have to haul themselves to the doctor's office or hospital for regular checkups. Better still, they won't end up in the emergency room after missing too many appointments that they just couldn't muster the strength to attend.

Researchers at the Medical College of Georgia and the Georgia Institute of Technology have developed an "electronic house call" prototype enabling patients to have virtual checkups in their homes. For a recent pilot run, 25 patients and a nursing home in the Augusta, Ga., area were given computers outfitted with touch-screen monitors, modems, video cameras that can be controlled remotely by a nurse, videoconferencing software and medical devices used to measure blood pressure, blood oxygen levels, temperature, weight and heart rate. Dedicated cable TV channels provided the link between patients and medical staff.

Electronic house calls were scheduled on a daily to weekly basis, depending on each patient's needs. But patients could also use the system more often to do self-checks, and the information was automatically incorpo-



Currently, the prototype costs about \$15,000 per unit, but the developers are looking for a corporate partner to mass-produce the system for less.

"We wanted a system that could help patients take better care of themselves," says Max E. Stachura, clinical director and interim director of the MCG Telemedicine Center, one of the hospitals involved in the pilot. "We also wanted one that could help address the very real issue of an aging population, wherever they might live. Now that we know we can do that, the next step is to look at how to make it as unobtrusive as our television set." ■

Now If It Could Just Bring Coffee...

REPETITIVE STRAIN INJURY You're sitting at your desk, typing a weekly report, when suddenly you hear a beeping noise. Your computer takes on the persona of your mother and tells you not to work so hard. What should you do? Answer: Take your eyes off the screen, hands off the keyboard and take a break.

IS professionals have long recognized the need to take certain steps to keep their computers running smoothly, and now their computers can return the favor. Office Athlete, a new software package from a Chicago-based company of the same name, is designed to prevent or ease

repetitive strain injuries associated with computer use by reminding users to take periodic breaks. When computer users install the program, they are asked a series of questions about their work habits, such as the average number of keystrokes or mouse clicks they make per hour. For users who aren't sure of their habits, default settings are available. Based on the settings, Office Athlete determines when users should take breaks and prompts them to do so at the appropriate times.

When the software is triggered, a small window opens in the upper right-hand corner of a user's screen and, if the user has asked for an audible reminder, a beep sounds,



***Grant me the strength to resist fads,
The wisdom to recognize legitimate plans,
And the sheer blind luck to know the difference.***

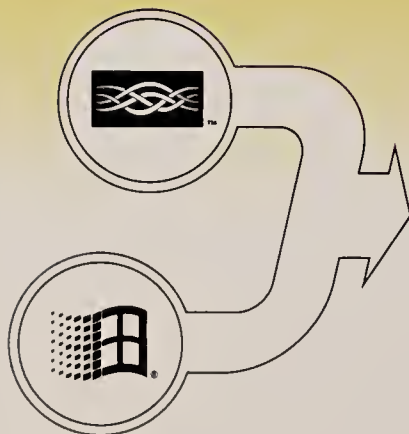
The IS Manager's Prayer



So, what makes BackOffice different?

**There are things we've learned
in twenty years of connecting people
and machines and information
that can help make the next twenty
years a lot less stressful.**

**Now, for the first time, we can offer you not just another bunch of applications
but a sane and sensible approach to evaluating technology solutions. It's called
Microsoft® BackOffice™ and it delivers something you probably don't expect
from technology—simplicity.**



BackOffice works on Windows NT® Server and Windows NT Server works on pretty much any system you might have in place. You can add a single Windows NT Server into your NetWare or UNIX environment and start running a BackOffice-based solution tomorrow. And Windows NT Server is tremendously scalable. So you can actually move the technology forward in well-planned steps, instead of the white knuckle, all-or-nothing leaps IS people are frequently forced to make.

Microsoft BackOffice
is a family of server
software applications
built around three core
philosophies.

Integration: You should be able to add new server capabilities into your existing system without starting from scratch. Moreover, you should expect cooperation between server products.

Comprehensiveness: Every BackOffice server will do its appointed job entirely and efficiently. Furthermore, the family of BackOffice products taken together, covers a comprehensive range of business needs. As businesses demand more from technology, BackOffice will continue to anticipate these demands.

Simplicity: A solution should not be any more difficult than it has to be. Thanks to their integration with Windows NT Server, thanks to their consistent interface, thanks to a bunch of basic design decisions, you will find BackOffice server applications to be easier to install, deploy and administer than any other system. It's that simple.

As goes BackOffice, so goes Windows NT Server. These three philosophies also apply to the relationship between BackOffice products and Windows NT Server. Not only is Windows NT Server famously easy to administer, but its integration with the family of products means that most administration tasks need only be performed once—for example, you just create one user per user, no matter how many applications they use. And Windows NT Server is inherently scalable—you can run a single Windows NT Server in a mixed environment or you can build a global network that runs entirely on Windows NT.



www.microsoft.com/backoffice/family

There is a BackOffice product for every business problem we can name. When you come up with more problems, we'll come up with more BackOffice solutions.

Windows NT Server

This is a multipurpose operating system capable of handling applications, file-and-print, communications and the Web. It includes Internet Information Server, a powerful transaction server and DNS server. And, by the way, it's the operating system that makes BackOffice work. We believe it is the future of network computing.

Exchange Server

This is an Internet standards-based server that delivers powerful messaging and collaboration capabilities. More than e-mail, Microsoft Exchange Server gives you business solutions like scheduling, group contact lists and task management.

SQL Server

This tremendously scalable, high-performance RDBMS features Internet integration, integration with desktop tools and applications, and an open-system architecture, making it a superior platform for delivering line-of-business and data warehousing solutions.

Systems Management Server

This allows you to centrally manage and troubleshoot your entire PC network—desktop and server computers. You can inventory hardware and software, deliver new software and perform diagnostic services—all from a single location.

SNA Server

SNA Server gives PC network users reliable access to host systems—from AS/400 machines to large mainframe systems. SNA Server can be used to support line-of-business applications like decision support, Internet/intranet access and online transaction processing.

Proxy Server

Proxy Server allows you to extend secure Internet access to the entire organization, easily and cost-effectively.

Future Servers

We are working on new server solutions and technologies right now—increasingly sophisticated online commerce solutions, for example, and the next generation of tools for the rapid creation of rich Web sites and Web-based business applications. You can count on seeing these and other new ideas built into BackOffice with the same attention to integration, comprehensiveness and simplicity that sets our current products apart.

Microsoft®

Where do you want to go today?*

How to buy

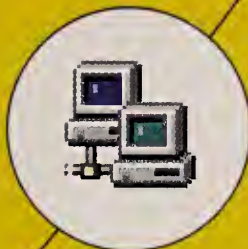
There is a wide range of products in the BackOffice family. You can get them in two different ways.

One-stop: get the BackOffice Server suite—including Windows NT Server, Exchange Server, SQL Server™, Systems Management Server and SNA Server. **Pick-and-choose:** get any individual server or combination of servers according to what you need and when you need it.



**Try to imagine champagne
without the bubbles.**
Windows NT Server makes
BackOffice possible.
BackOffice makes Windows
NT Server powerful.

Together, the
whole is greater
than the sum of
its parts.

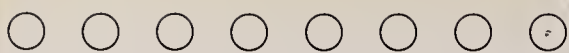


*BackOffice is not a noun.
BackOffice is an adjective. For
example, if you did your job well,
collaborated effectively with your
coworkers and were basically
enjoyable to work with, you'd be
a BackOffice kind of person.*





www.microsoft.com/backoffice/vision



CIO

PERSPECTIVES

October 12-15, 1997
 Ritz-Carlton
 Naples, Florida

Core Competencies and Competitive Advantage:

Think Internally, Act Externally



Keynote Presenter
F. Warren McFarlan
Harvard Business School

Also Featuring

- | | |
|---------------|--------------------|
| Peter Bergman | Christopher Hoenig |
| John Cross | Loretta LaRoche |
| James Donehey | Abbie Lundberg |
| | Paul Saffo |

Moderator – Dr. Jim Wetherbe

For more information call 800 366-0246

CORPORATE HOSTS

AXIOM	CABLETRON systems The Complete Networking Solution™	CENTURA SOFTWARE CORPORATION formerly known as GUPTA	CISCO SYSTEMS	Data General	DELL	EDS
ERNST & YOUNG LLP	hp HEWLETT PACKARD	Hyperion	IBM	INFORMIX	intel	LBMS
CKHEED MARTIN	Lucent Technologies Bell Labs Innovations	SEQUENT	Sun microsystems	TEXAS INSTRUMENTS	TEL	

Trendlines

informing him or her that it's time for a break. The user can then either ignore the reminder or take a break, in which case a click on the reminder window causes a second window to appear with animated demonstrations of a series of stretching and relaxation exercises.

Office Athlete also includes a hypertext library of ergonomic and health information, and can be installed across a network or intranet. It is priced at \$69.95 for a single copy (site licenses are also available at reduced pricing) and is available for Windows 3.1 and higher, including NT.

For more information, contact Office Athlete LLC at 800 870-3746 or oathlete@ais.net. ■

Findings IT Staffing

Can't Find Help? You're Not Alone.

Having trouble filling vacant slots in your IT work force? Lie awake nights brooding over the rapid rise of salary costs even for entry-level programmers?

Join the club, says the Information Technology Association of America (ITAA). ITAA recently surveyed about 2,000 companies, evenly divided between IT and non-IT industries, to determine the scope of the IT hiring crunch. The survey found that there are approximately 190,000 unfilled IT positions in the United States in large and midsize companies alone. That's roughly one vacant position per 10 IT employees, according to the survey. Factor in small companies and government agencies, and the numbers balloon accordingly, says Amy Callahan, a vice president of information technology services at ITAA.

The truly bad news is that the problem will probably get worse before it gets better because demand for qualified IT staff continues to rise. About 80 percent of large and midsize companies expect to increase the number of IT

workers they employ; only 2 percent expect to reduce their IT work force. And the educational system isn't exactly cranking out new IT graduates: Between 1986 and 1994, the number of bachelor's degrees in computer science awarded annually at U.S. universities fell by 43 percent (from 42,195 to 24,200), according to ITAA.

More demand plus lower supply equals higher salaries. ITAA also concludes that more IT work will be outsourced overseas to get around the workforce shortage in the United States.

Callahan says ITAA conducted the study fully expecting such results; in fact, the methodology was designed to keep estimates conservative, she says. ITAA, an Arlington, Va.-based trade organization of IT vendors, aimed to provide concrete evidence of the opportunities in IT to document the need for university IT programs; the eventual goal is a bulked-up IT workforce. "We've gotten responses from over 700 professors saying, 'This is exactly what we needed,'" Callahan says. The findings are also useful for CIOs who seek to educate upper management on the challenges of IT staffing, she says.

For more findings or information on how to receive the entire report, check the ITAA Web site at www.itaa.org or call 703 522-5055. —Derek Slater

Changes in IT Compensation

Average salary in thousands

Job Title	1995	1996	Percentage Increase
Operating Systems/ Software Architect/ Consultant	\$71.5	\$85.6	19.7
Network Control Supervisor	\$47.7	\$56.1	17.6
Operating Systems/ Software Programmer/ Analyst Manager	\$78.7	\$92.2	17.2
Customer Support Technical Associate	\$27.7	\$32.2	16.2
Software Development Programmer/Analyst- Lead/Specialist	\$58.2	\$66.5	14.3
Application Programmer/ Analysis Manager	\$71.7	\$80.7	12.9
Software Development Architect	\$69.4	\$77.7	12.0

SOURCE: WILLIAM M. MERCER INC., LOUISVILLE, KY.; JANUARY 1996 SURVEY OF 91 ORGANIZATIONS

The SAS® Data Warehouse Solution

Merrill Lynch

merrill lynch roi=1464%

Merrill Lynch

ROI=1464%

Return On Investment

LTV Steel Company

ROI=16,995%

LTV Steel

ltv steel roi=16,995%

LTV Steel

Smart business decisions.

Even smarter investment.

A recent International Data Corporation (IDC) study of organizations that have implemented data warehouses reveals an average three-year Return on Investment of 401%! There's no better choice for reaping similar rewards than the SAS Data Warehouse, a data warehousing Product of the Year for two years running.

And the world's only end-to-end warehousing solution for managing, organizing, and exploiting your business data—including data from external sources. Here's what two companies featured in the IDC study have to say:

MERRILL LYNCH ROI=1,464%

For this leader in financial services markets, the SAS Data Warehouse yielded fast payback and measurable benefits. According to John Crawford, VP of Reporting Systems in the Marketing Systems Group, "We've been using SAS software for all of our solutions in terms of our data warehouse implementation, and our return on investment has only grown...it's a broad-scope, well-integrated solution that provides all of our data warehousing needs from one vendor, and there's no other single vendor out there capable of doing that."

LTV STEEL COMPANY ROI=16,995%

As the third largest steel operator in the U.S., they've been using SAS software for data warehousing since long before the term was coined. According to Quality Assurance Senior Analyst Robert Scharl, "SAS software is THE element of our data warehousing solution. It beat everything else for data retrieval...and it would have cost us maybe a half million dollars to bring something else in for a data warehousing system."

The top-of-the-line data warehousing software
will have a positive impact on your
business decision makers.

And wait until you see what it does
for your bottom line.



SAS Institute Inc.

The Business of Better Decision Making

E-mail: cio@sas.com

www.sas.com/dw/

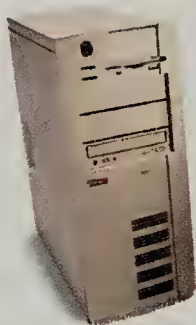
919.677.8200

In Canada 1.800.363.8397

SAS is a registered trademark of SAS Institute Inc. Copyright © 1997 by SAS Institute Inc.

IT'S A WORKGROUP SERVER THAT PERFORMS

IN



The ProLiant 800

There's one thing you can count on in the future. Your workgroups will demand more. More performance. More reliability. More expandability. Oh yes, and make it affordable. Which brings us to the Compaq ProLiant 800. It's a server with break-

through price:performance that lets you keep pace and respond quickly. Without overhauling your network. It may be used as only a file and print server now, but you can add a few small applications and groupware ones later. In short, its performance grows as your demands do.

Next-generation technology (like Pentium® Pro Processors and Wide Ultra SCSI), a flexible platform, and scalability for future growth make certain of it.



Our SmartStart and Insight Manager make configuration and management effortless. Making the ProLiant 800 even more affordable to maintain down the road. Which makes sense, since it will still be around when you get there.

The ProLiant 800 is just one more example of something we call Access—the way we're connecting people to people, and people to information. All over the world.

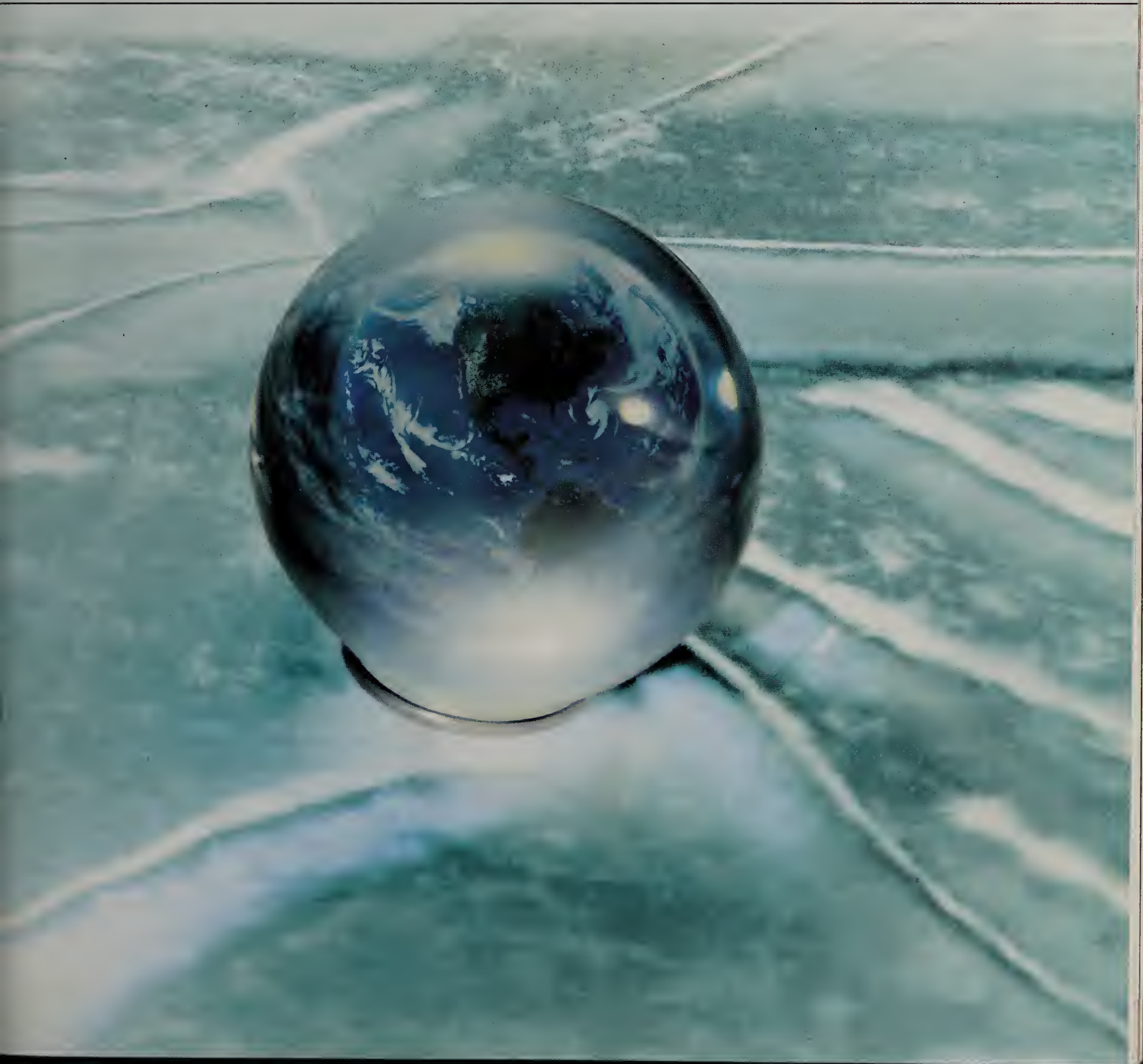
For more information on the ProLiant 800, contact the nearest Compaq Authorized Reseller or visit us at www.compaq.com.

©1997 Compaq Computer Corporation. All rights reserved. Compaq registered U.S. Patent and Trademark Office. ProLiant, SmartStart and Insight Manager are trademarks or registered trademarks of Compaq Computer Corporation. The Intel Inside Logo and Pentium are registered trademarks and the Pentium Pro Processor Logo is a trademark of Intel Corporation. In Canada, we can be reached at 1-800-567-1616.



COMPAQ

THE MOST COMPETITIVE OF ENVIRONMENTS. THE FUTURE.



Trendlines

Small World, Big Plans

HEALTH-CARE DELIVERY First they created the “happiest place on Earth.” Now it appears they’re aiming to help create the healthiest, too. And IT will help make it happen. The busy people of The Walt Disney Co. have teamed up with Florida Hospital to develop an innovative new health-care system in Celebration, Fla., a new community that is itself based on a vision Walt Disney had many years ago.

The central Florida town of Celebration, which was just recently incorporated, was designed by the Disney Co. to combine the friendly community feeling of the small town of yesteryear with the best of modern-day conveniences to create a place that “celebrates” the traditional American hometown. Celebration Health, scheduled to open this fall, will help realize that vision by employing leading-edge IT tools

to provide an integrated delivery system spanning the entire Celebration community.

The health network will start at home, where Celebration residents will use telephones or computers to plug into the Celebration Health fiber-optic network, through which they will be able to ask nurses questions, schedule appointments and consult with personal health counselors. The network also will allow patients to monitor medical conditions such as high blood pressure and diabetes from home.

At the Celebration Health facility itself, a 265,000-square-foot center that will include physicians’ offices, operating rooms, and rehabilitation and fitness centers, IT will be prevalent. A few examples:

- A computer-based patient record system will go beyond just

replicating paper patient records to allow multiple users in separate locations to access the information simultaneously.

- ATM and wireless networks will transport video, voice and data throughout the Celebration Health network—even to mobile users.

- Handheld computers will enable physicians to access medical histories, see X-rays, update electronic patient records remotely and even transmit prescription orders to the Celebration Health pharmacy.

- Personal communication devices



No Seed Required

VIRTUAL PETS If you’re like many, you’ve often longed for the companionship and love only a pet chicken can provide. Yet you’ve been held back by the fear of sky-high seed bills, or possibly the lack of appropriate accommodations for one in your backyard.

Well, chicken-lovers, take heart:

Thanks to a new Japanese innovation, you can realize your dreams at last.

The brains at Bandai Co., perpetrators of the Power Rangers, have hit pay dirt again with a virtual reality pet called Tamagotchi, Japanese for “cute little chick.” Billed as cyber creatures who have traveled from afar to learn about life on Earth, the chicks inhabit an LCD screen in an egg-shaped plastic toy.

By pushing buttons on the egg, owners can interact with and care for their virtual charges.

But beware: Bringing up a Tamagotchi is still a major undertaking. After it “hatches,” the cyber chick will peep when it requires attention, and you must feed it, discipline

it, play with it, even clean up after it, all by pushing the right buttons at the right time. “If you keep Tamagotchi full and happy, it will grow into a cute, happy cyberpet,” the owner’s manual explains. “If you neglect Tamagotchi, it will grow into an unattractive alien.”

The chicks eventually return to their home planets,

but as with any pet, the better the care, the longer they stay (the record is 26 days).

The crucial difference with a Tamagotchi is that when it departs, you can hatch yourself another.

In Japan, people of all ages have been snapping the toys up at a furious rate (350,000 in the first 30 days after they were released), often paying more than 20 times the retail price on the black market when the stores are Tam-

agotchi-free. Bandai America Inc. is hoping

for similar success when the chicks, which will cost just less than \$20, are let loose throughout the United States this month. For more information or to amuse yourself by reading instructions translated from the Japanese, visit www.bandai.com. ■





“TAKE IT FROM SOMEONE
WHO DEALS IN
ETERNAL
REWARDS.”

InPower Total Compensation Management is above and beyond anything in the client/server marketplace.

If you're looking for Total Compensation Management: a universal view of payroll, benefits, everything you use to attract, reward and retain your employees, put your faith where the Ultimate Human Resource Manager has – InPower.

Every day that you deal with broad-banding, at-risk pay, or team-based compensation is Judgment Day. Which is why InPower completely redesigned strategic HRMS/Payroll, rather than porting antiquated mainframe systems to the desktop.

InPower Total Compensation Management administers everything that influences true employee costs, from commuter checks to bonuses, from child care to life insurance.

And it's all integrated into one single, simple-to-use system, enabling one-stop reporting and “what if” analysis for employees, their dependents and beneficiaries.

“LET MY PAYROLL GO.”

InPower redesigned payroll to be a total compensation disbursement system. And, InPower's Total Compensation Management architecture set new client/server payroll performance standards in testing at the Hewlett-Packard Company's Benchmarking Center.

All told, InPower Total Compensation Management gives you fewer systems, lower costs, and the innovative compensation plans required by today's non-traditional workforce. For more information, call: 1-800-930-0165.



InPower

Managing the realm of human possibility.™

Phone: 1-800-930-0165 Fax: 1-800-695-8262 Url: www.inpower.com Email: info@inpower.com

The InPower logo is a trademark of InPower, Inc.

HP® & InPower deliver breakthrough client/server payroll performance. Call 1-800-930-0165 for a complete benchmark report.

Trendlines

"Typical" IS executives in managed-care organizations earn a base salary of \$92,000 and have 16 years of IS experience. Eight of those years are in managed care.

SOURCE: FURST GROUP/MANAGEMENT PARTNERS INC., ROCKFORD, ILL.

will be provided by the Celebration Health concierge to patients entering the facility. Rather than sit in a waiting room, patients will be able to wander and browse through the lobby or shops until they are paged by their doctors.

■ Computer kiosks in the Celebration Health facility lobby will allow patients to obtain nutrition information, contact the pharmacy and schedule doctor appointments via touch-screen monitors.

Celebration Health is being developed and will be operated by Florida Hospital, a 1,478-bed acute-care facility run by the Seventh-Day Adventist Church. The second-largest hospital in the state, Florida Hospital is basing its Celebration approach in part upon its own Florida Hospital Healthcare System.

In addition to Florida Hospital, Celebration Health benefits from the efforts of several strategic allies, including GE Medical Systems, Johnson & Johnson Co. and Eli Lilly and Co.

—Tom Field

Where Were You 10 Years Ago?

THE CIO DECADE

READER SNAPSHOT

Bert Reese

Corporate Director for Information Systems, Sentara Health System, Norfolk, Va.

Career Moves, 1987-97:

One company, one position. "The title has remained the same, but the size of the company has gone from \$125 million per year to \$1 billion and IS responsibilities have increased tenfold."

Years Reading CIO: Since its inception

Ten Years Ago: In sixth year as corporate director for IS at Sentara.

Greatest Professional

Moment: "Waking up one day and realizing it was all working. We generally talk about where

we're going, not where we've been. It's in those moments when you reflect on your old visions and see that some of them have come into fruition. It's, 'Oh my God, look—we did what we thought we were going to do.'"

How His Office Has Changed in the Last Decade: It hasn't. "People who come see me ask me if I'm ever going to finish it. In the last 16 years, I still haven't purchased all my furniture."

One Thing He Would Do Differently: "I would have accelerated the integration of the health system. Back then, we were in acquisition mode and we let stovepipe departments work autonomously until they had as much growth as they could take, and then we integrated them. We should have had an integration strategy earlier on."

Alternative Career Choice: "Maybe an architect. I like designing things that you can't initially see. Computer systems are a lot like that."

Most Important Lesson: "Grow your staff in the next level down. They're your most important asset because you can't be in all places at all times."

—Jennifer Bresnahan

[Editor's note: Reese is also featured in "A Delicate Operation," Page 44.]

IN SEPTEMBER, we'll celebrate the 10th anniversary of CIO. In the months leading up to our 10th Anniversary issue, we're asking readers to look back and tell us where they were in 1987 and how they ended up where they are today. We invite you to tell us your story when you visit our Web site at www.cio.com/snapshots/.



QUALITY

WHEN IT'S QUALITY YOU'RE LOOKING FOR...

Look to PKS Information Services, Inc. At the core of PKS' quality process is an unrelenting focus on customer satisfaction.

Excellence in customer relationships makes PKS the quality leader in computer outsourcing and systems integration services.



PKS

**INFORMATION
SERVICES, INC.**

A Peter Kiewit Sons' Company

PKS Information Services, Inc.

Phone: 800.757.9886

Fax: 888.894.8680

www.pksis.com

Executive Counsel *By Christopher Koch*

MANAGING YOUR CAREER, STAFF AND PROFESSIONAL RELATIONSHIPS

Cutting Deals with HR

Paying staff what they're worth means selling human resources

LIKE STOCKBROKERS, IS MANAGERS have had their share of experience with volatile markets. They've seen the value of their employees' skills rise faster than the Dow on a record day. Just ask Bob Kaya and Kurt Dahl of The Seattle Times Co. The market value of one of their analysts jumped by about 40 percent recently when the latest wave of technology speculation rolled in, this time based on the popularity of SAP AG's R/3 client/server software package.

For the Times' human resources department, that meant dealing with a request from IS to boost the salary of the lone analyst at the company familiar with SAP to compete with outside job offers. Like most companies, the Times has a compensation system that assumes slow growth in salaries and bonuses, and HR wasn't prepared to deal with pleas for dramatic base-salary increases, says Laura Boyd, compensation and benefits manager.

That kind of conflict between an IS department desperate to hold on to

staff and an HR department intent on following the rules is more the norm than the exception, says Beverly Lieberman, president of Halbrecht Lieberman Associates Inc., a CIO executive search firm in Stamford, Conn. "HR people don't have the clout or the authority or the nerve to modify existing pay systems for one particular constituency," she says. "HR is there to get people to conform across the board, and that is a big problem."

SHIFTS IN THE MARKET VALUE OF IT skills are felt most at smaller companies like the Times, where IT resources already are scarce. Kaya, information services financial systems manager, and Dahl, vice president of information technology, had exactly one SAP technology analyst in their department, Andy Rash. Replacing him would be difficult and expensive because he covered a lot of turf. Meanwhile, Boyd struggled to balance keeping Rash on staff with maintaining fairness in compensation across the company.

Caught in the middle was Rash, a six-year veteran of the Times, who not only had acquired skills in a hot technology but had proven himself a quick study during the high-speed SAP implementation.

His ability to fend for himself did not go unnoticed by his former project teammates at ICS, the subsidiary of Deloitte & Touche Consulting Group that helped implement the software. One of them was Kevin Funk, a former Times financial analyst who jumped to ICS during the project. Soon, ICS began courting Rash, too. "We developed a great relationship with ICS during the course of the project," says Rash. "And as you work with consultants, you begin talking about the opportunities they have."

The intense demand for SAP skills stunned Kaya. "As soon as we finished installation [of SAP], we began getting calls, and our people were getting calls



[for job opportunities],” he says. “I gave a talk to my people and said we would not and could not match the offers from outside companies.”

Normally, that would have been the end of it. Rash and the Times would have parted as friends. But Rash was not keen on being a consultant, and he said so. “I’ve been upfront with everyone here since the beginning, saying that the idea of working as a consultant isn’t appealing to me,” he says. “I have two children, and both my wife’s and my families are here [in Seattle], so the travel was an issue.”

And Rash says he never expected the Times to match the offers from the consultancies and big companies. He understood and valued the “invisible” benefits that he accrued at the Times: job stability, interesting projects, opportunities to take on new work and responsibility, and a friendly, small-office environment. He was willing to forgo some of the cash from consulting opportunities if the Times would raise his salary to reflect his

Getting Warmer

Though SAP is the hottest of the hot skills right now, Davis & Neusch Inc.’s survey found some close contenders in the skills market, which are ranked below in order of popularity:

1. Computer animation
2. Relational database management systems (bonus dollars are especially high in this category, according to D&N)
3. Internet/intranet development

true value to the company. Kaya and Dahl went to the Times’ HR department expecting a quick resolution.

But things are never as simple as they seem—especially when it comes to compensation. The Times’ compensation scheme defines job roles and salary levels across the company rather than on a departmental basis. Job functions at the Times are each assigned to one of 22 different salary ranges. Rash’s job title, sys-

tems analyst, was in the 14th salary ranking at the Times, a distinction he shared with colleagues from many other functions at the company—most notably finance, whose managers also had circled the wagons around their SAP-trained analysts. Boyd knew that if she made an exception for Rash, finance would be interested in similar treatment.

So Boyd rebuffed Dahl’s initial requests to bump up Rash’s salary while she and her department researched the market to see how much money SAP analysts at other companies were making. “It took a bit of time to listen to each other and get each other’s perspectives,” says Boyd of her negotiations with Dahl and Kaya. “They thought it was just a compensation issue, and I saw it as a bigger issue. They felt hostage to the compensation issue since I held the reins on that, and they felt it was risky and that if we didn’t act quickly, we’d lose him.”

Eventually, Rash received a raise and a “retention bonus” that is renewable

Base your network on

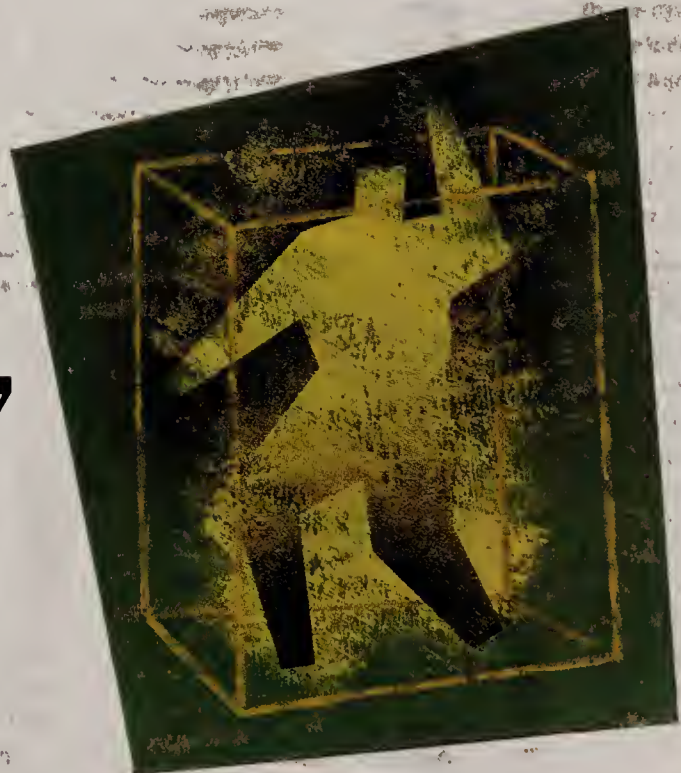
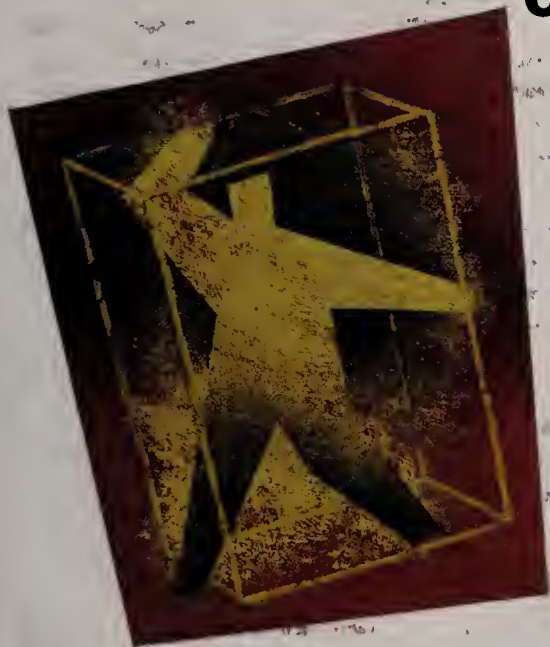
configurations and

equipment from

square one,

and that’s exactly

where you’ll stay.



Executive Counsel

each year depending on the market demand for SAP skills. Rash was not happy with the retention bonus alone. He felt it was grudging—and temporary—recognition of the value of the knowledge in his head. “This was a stop-gap solution in my opinion,” says Rash. “The Times’ point of view is we can offer an annual bonus because this software is extremely hot and we want to keep this knowledge here. As soon as we feel the software isn’t hot, then we won’t do that.”

“That’s the downfall of these bonuses,” acknowledges Boyd. “They can cause the employees to see themselves as commodities.”

Rash wanted something that would demonstrate the Times’ commitment to his future growth. He wanted more than a raise; he wanted to move up a grade level on the salary scale. He was close to the ceiling for his grade, which meant that he would be eligible only for cost-of-living raises in the future. He says he felt his job description did not begin to describe what he actually did—which included managing a major addition to the SAP system that went live in January.

Kaya and Dahl were asking him to stay but were unable to give Rash an answer about his future. “I didn’t realize how much true control HR has in some of these situations,” says Rash. “Someone like Kurt Dahl, the vice president of IS, has a clear notion of what the values and issues are, and HR is working off of a list.”

Boyd has heard those complaints before. “Managing compensation is not a science,” she says. “It’s an emotional issue for people. Holding this in the HR department is an effort to get some objectivity in the system. It’s to provide internal equity, especially when we’re working on interdisciplinary teams where there are representatives from different departments.”

But objectivity and speed do not have a natural affinity. For Rash’s pay level to change, his job description needed to change to include more responsibilities and management duties. Boyd also needed to keep track of other functional areas of the company, such as the finance department, to see if changes were warranted. Rash’s case alone did not spark this job function soul-searching, says Boyd, but his fortunes became tied up in

it. “The lines have blurred between who is a project manager and who is not,” she says. “Now we have users understanding the system and making suggestions in documentation and how it should work, whereas before that was all in IT. It was difficult deciding whether Andy really was the SAP expert because when you put that question to the business side, they say, ‘No, we have an expert, too.’”

Boyd mediated long discussions between the IS managers and the business function managers to decide how to reapportion the value of traditional IS job functions. In the value competition, analytical ability and project management skills won out over just plain knowledge. Application programmers pounding away on maintenance work were “downgraded,” meaning that their “target compensation” was reduced, thus diminishing their potential for big raises, Boyd says. Meanwhile, people with multiple systems experience and project management skills, like Rash, moved up in the ranks. “Arriving with the knowledge in your head used to be more valued,” says Boyd. “Process skill is more valued now—the ability to analyze problems and help others be involved in the solution.”

By the time HR and IS arrived at a mutual decision, Rash was just about out the door. It had been nearly six months since he first told Dahl and Kaya about his offer from ICS, he says. “I had some hard discussions with my family and was going to say yes to ICS,” he recalls. “Then finally, HR came down with its decision.”

Here too, the Times held the trump card, however. At the time of the SAP installation, both ICS and SAP signed waivers pledging not to raid staff from the Times—a standard part of implementation contracts, Boyd says. ICS could not have hired Rash unless the Times agreed to sign the waiver. “It’s not standard for consulting companies to raid people from companies they have just worked with,” she says.

Although Rash knew he needed a waiver to go with ICS, he figured that the Times, which had signed the waiver for people such as Funk, would also do so for him.

But Rash reached an agreement with the Times before the waiver became an issue. He says he is satisfied with the salary

IT's Most Wanted

SAP skills top the demand chart

IN AN ERA OF HOT TECHNOLOGIES, SAP AG’s R/3 client/server software is the pick of the litter, according to a recent survey by Davis & Neusch Inc., a Richardson, Texas, compensation consulting company.

The survey, conducted last fall, found that full-time, in-house corporate SAP analysts at all levels commanded on average higher total compensation and more lucrative bonuses in 1996 than analysts in any other hot technology “cluster,” such as Internet and Web development. The survey of 69 companies broke out average total compensation across four levels: entry-level SAP programmers, who make \$30,000 to \$60,000 per year; “journeymen” with deep technology experience (\$40,000 to \$70,000); “senior” project leaders and systems engineers (\$50,000 to \$80,000); and finally SAP “gurus” who work with the highest-level business executives on the project (\$70,000 to \$100,000).

Attracting and retaining those experienced analysts is difficult—a fact reflected in the myriad responses to the survey’s question about bonus programs. The most common offerings were stock options; awards and recognition programs; additional training, mentoring and coaching; reviewing compensation more frequently; and formalizing incentives for retention purposes. “Companies are realizing that something needs to be done to retain these people,” says Doris Blesh, senior consultant for Davis & Neusch, who supervised the survey.

—C. Koch

compromise and his new title—senior financial systems analyst—but he still wonders why the process took so long. “I had to take it to the point where I said, ‘Look, I’m out of here,’ and that was when I got a reaction,” he laments. Boyd says HR’s offer was not a response to Rash’s threat to leave, but she does acknowledge that the process took a long time.

As for the cause of the time delay in resolving Rash’s case, Dahl offers a mea culpa, noting that he was new to the Times and did not understand the HR system. “I didn’t have a sense of how sacred the grade-level system was,” he says. “It’s important for IS executives to understand that HR has a broader responsibility to consider other departments of the company and be fair across the board. Going in there and simply demanding money is not going to work.”

To Dahl, Rash’s situation is a portent

of the future rather than an anomaly. IS managers need to find faster, more flexible ways of addressing the wild fluctuations in the IT skills market. “The thing we have to do in our industry is get a clear

“Arriving with the knowledge in your head used to be more valued. Process skill is more valued now—the ability to analyze problems and help others be involved in the solution.”

—Laura Boyd

understanding of the cost of losing an employee,” he says. “Not only in terms of what it would cost to recruit someone new but the incredible value of the knowledge in his or her brain.”

Dahl says he has learned his lesson and is creating ways to respond more quickly when one of his staff members raises the red flag. He says he is putting together a retention program for the entire IS department but says that’s not enough.

“It’s no longer simply a matter of being competitive in terms of salary,” he says. “We have to give people more reasons to stay.” Some options Dahl is considering: telecommuting and paid two- to three-month sabbaticals if employees remain with the company for three years. HR has not yet approved either option.

For her part, recruiter Lieberman argues that HR departments should be out of the loop entirely for these types of decisions. “Today it’s Oracle and SAP people; yesterday it was IBM mainframe programmers,” she says. “This problem should not be in the lap of the HR person; it should be in the lap of the CFO or CEO as a major issue that affects a company’s ability to exist in the marketplace.” **CIO**

Senior Editor Christopher Koch can be reached at ckoch@cio.com.

Break out

with a partner who can

see the end beyond

the technological means.



Known Evils

Common pitfalls of knowledge management

DEPENDING ON WHEN YOU believe organizations got started with knowledge management—some would trace it back to Socrates, others to the introduction of Lotus Notes—we've now been at it for at least a few years. Thus we ought to have learned something about what works and what fails. But I keep running into companies and organizations that are falling into what should by now be well-known pitfalls of knowledge management. I usually know that the pit is occupied when I hear a telltale sentence or two that is a sure tip-off that one of the bad ideas itemized here has taken hold. What follows, therefore, are the top seven (aren't we all tired of 10?) pitfalls of knowledge management, clues on how to spot them and my simple advice on how to deal with them.

1. If We Build It... They will come. Wrong. At least, your building it has little to do with whether they will come. "It," of course, is an information technology-based system for storing and distributing knowledge. You can buy as many Notes or Netscape licenses as you want; you can create a helluva nice-looking Web page; you can even put some Javanese interactive apps on your system—but it doesn't mean anyone will use or benefit from your investments in technology.

Here's my rule of thumb (actually, it's Boston-based IBM consultant Larry Prusak's rule of thumb, but "well stolen is half done"—come to think of it, that's his phrase too): If you're spending more than one-third of your time on technologies for knowledge management, you're

neglecting the content, organizational culture and motivational approaches that will make a knowledge management system actually useful.

2. Let's Put the Personnel Manual Online! This pitfall sounds something like the following: "Now that we've got our intranet up and running, we've got to populate it with knowledge. Gee, how about the personnel manual, the procedures manual, our cafeteria menus and the campus shuttle-bus schedule?" Puh-leeaaaze. The Web and Notes are exciting technologies. Were they developed for that? OK, I'll grudgingly grant that digitizing that boring stuff has some efficiency advantages, and I'm as much in favor of saving trees as anyone. But don't call it knowledge, and don't call the system on which you install these yawn-inducing tomes a knowledge management system. The terminological currency gets weakened, and should you later put some real knowledge into the repository, no one will notice. Let's use the technologies that have sparked the rise of knowledge management to store and disseminate real value-added, insight-laden, wisdom-giving knowledge. Be a stickler for worthwhile content. Your "knowledge base"

will grow more slowly, but no one will chuckle when you call it that.

3. None Dare Call it Knowledge. As you have known since grade school, we live in an anti-intellectual society. In companies where a few lonely individuals are pursuing knowledge management, the intellectual-phobic sentiment sounds something like this: "We're afraid to use the term 'knowledge' because everyone in the company is so pragmatic. So we call it 'best practices.'" Now, I am sympathetic to this problem, being a resident of Texas and having grown up in Alabama—which have got to be the most anti-intellectual places on earth. But I think

it's self-defeating to try to conceal what you're really doing by calling it something else. If the word "knowledge" isn't acceptable in your organization, your knowledge management program probably won't succeed no matter what you call it.

Here's why it's a bad idea to refer to knowledge as best practices, benchmarks, information resources or whatever convenient label your boss happens to prefer. First of all, none of those terms does justice to the entire domain of knowledge. If you call it best practices, for example, does that reflect the knowledge of a customer's needs and business situation that involves no practice at all? If you call it something related to information, you'll be dragged back into the corporate in-

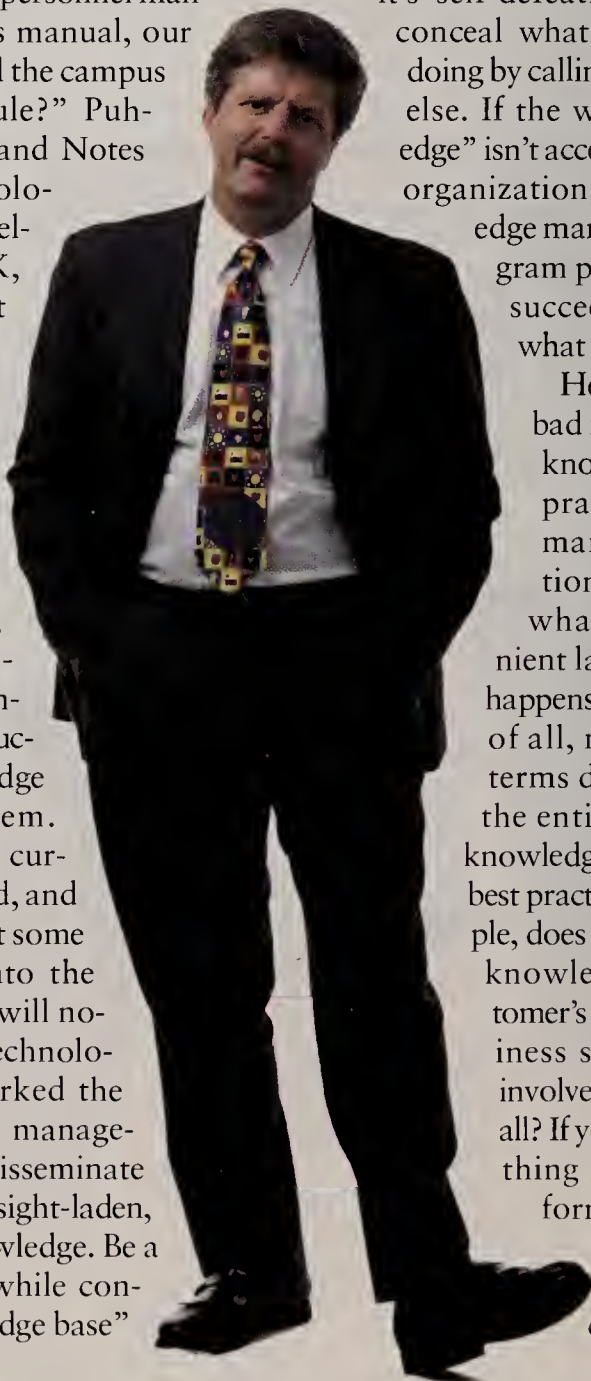


PHOTO BY WYATT McSPADDEN; CORNER IMAGE BY CARL TREMBLAY

More important than design knowledge.

Beyond inventive router configurations.

ALLTEL Enterprise Network Services

thinks outside the boxes of networking to help you
outdistance your competition.

By going beyond the peripheral vision, our services can help you
improve productivity, create effective customer relationships
and successfully enter new markets.

Expand your mind.

Expand your margins.

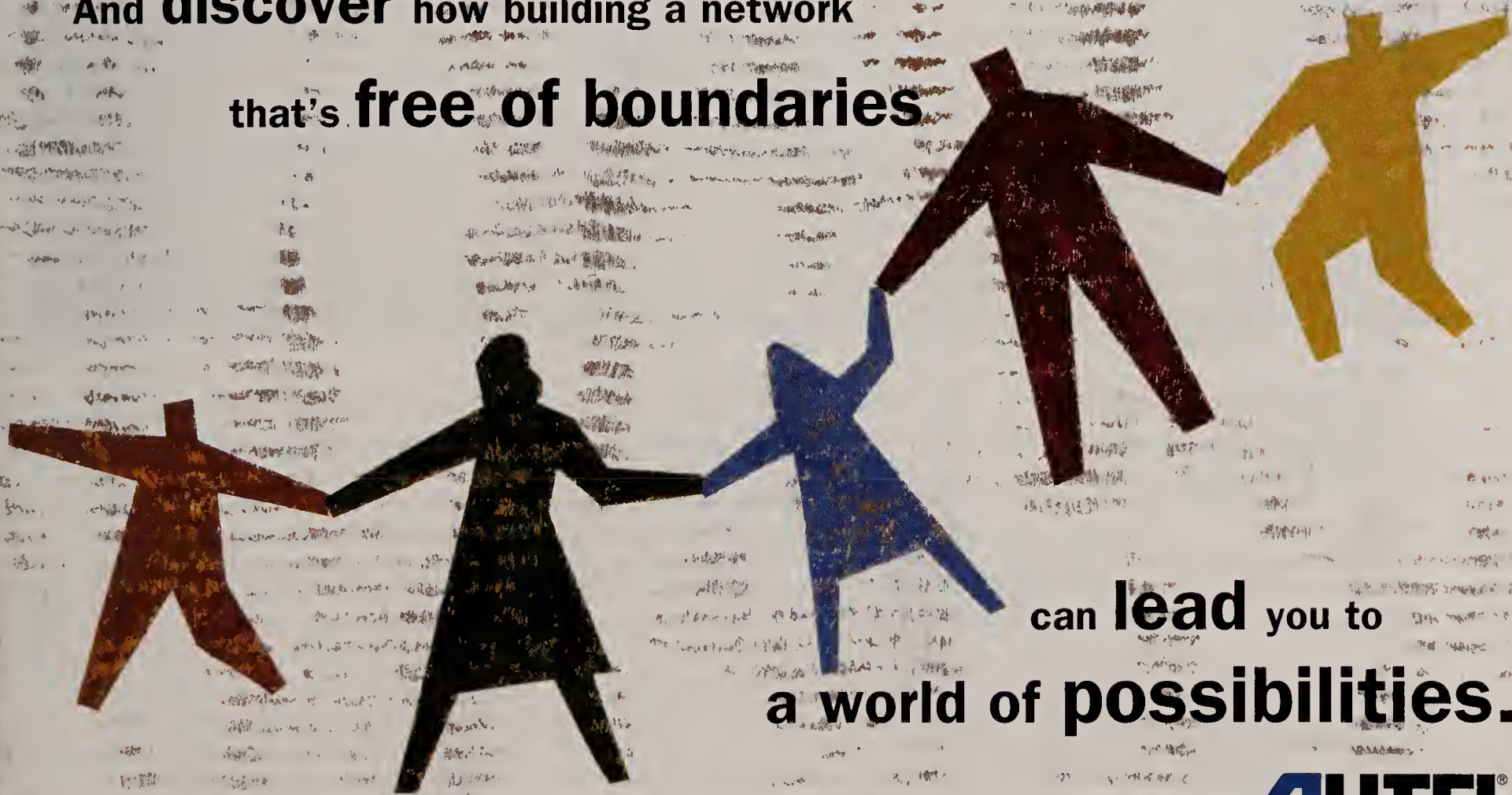
Call us today.

1-888-559-4ENS

972-866-1400

www.alltel.com

And discover how building a network
that's **free of boundaries**



can **lead** you to
a world of possibilities.

ALLTEL®

Think Tank

formation systems morass that really involves data. OK, if you want to call it intellectual capital, I'll get off your case; you clearly have no problem with effete terminology.

More important, the inability to use the word knowledge suggests that the senior managers in your company don't buy into the big ideas behind knowledge management—that what people know and can learn is more valuable than any other business resource. Eventually those Philistines will cut back the funding for your Information Resource Center or your Best Practices Database when they find out what you're really up to.

So I say call it what it is, and down-to-earth American pragmatism be damned. Spend your time arguing about the worth of knowledge up front, rather than fighting rear-guard skirmishes later on.

4. Every Man a Knowledge Manager.

This problem is related to the previous one. The telling remark here goes something like, "We think knowledge management is everybody's job. So we're not going to build up some big staff organization of knowledge managers to do the work everyone should be doing." Like most myths, this one has a grain of truth in it. It should be everyone's job to create, share, and use knowledge—to some degree.

But let's face reality here. Every engineer in your organization, for example, should be creating and using new product development knowledge. But not every engineer will (or can) do a good job writing down what he or she knows. Everyone should reflect on life, but not everyone should write poems or novels about his or her musings. Knowledge management will not succeed if there are no workers and managers whose primary duties involve gathering and editing knowledge from those who have it, paving the way for the operation of knowledge networks, and setting up and managing knowledge technology infrastructures.

The next time someone starts spouting the "it's everybody's job" rigmarole to me, I'm going to retort, "So I guess since it's everybody's job to monitor costs and enhance revenues, you've also eliminated the finance and accounting departments?"

5. Justification by Faith. This one's a little less common than the others. I

know an organization has fallen into this trap when I hear this: "Our CEO is a big believer in knowledge management. So we don't feel the need to justify our knowledge management work with numbers or anecdotes—we've got faith!" Well, faith may propel us into heaven but it won't help us keep our knowledge management jobs. Every week or two I speak with a former manager of reengineering whose boss used to have faith in that concept—and those people are looking for jobs.

Even if your senior management team is gung-ho about knowledge, the crunch will come eventually. A new CEO will come in, the company will have a bad quarter, some hot new fad will come along. And a powerful person will utter the fateful words, "Exactly what are all these knowledge managers doing for us?"

So even if no one is interested today, start trying to measure the worth of what you do. If possible, quantify the knowledge you manage in terms of cold, hard

For thousands of years, knowledge has been associated with hierarchy.

cash that the company has made or saved because it was fortunate enough to have you as a knowledge manager. If that is impossible (and remember, even accountants can be creative these days), do some serious "anecdote management," with sworn testimony from the regional sales manager that "this sale would not have gone through without the knowledge in our Xpert Xchange." Consider reprinting such remarks in your monthly newsletter. If your company frowns on internal boosterism, keep the numbers and anecdotes in your drawer until you need them—because you will someday.

6. Restricted Access. "We're trying to create better access to our knowledge." Red lights flash before my eyes, sirens go off in my head, my blood pressure skyrockets. Access is oversold, overblown, overdone. Do you really think the reason no one ever looked at the market research reports was because they had to walk up a flight of stairs to get to them? That the sales force didn't consult white

papers on product performance because they had to make a phone call to get a copy? OK, I admit that it's amazing how lazy we all can be and that easy access to knowledge sources does increase the likelihood that they will be consulted. But it's just the first step and often the easiest one.

The next time someone on your project team uses the A-word, speak up with some substitutes. How about "attention"—as in how do we get anybody to pay any of it to what we're doing? How about "appetite"—is anyone really hungry for our knowledge? Why not "affiliation"—a bit of a circumlocution, but how can we get people to feel loyal and trusting enough to share their knowledge with co-workers?

7. Bottoms Up! The catch phrase here is, "Knowledge management isn't a hierarchical thing in our company. We don't need senior management approval; they're not the ones with the knowledge anyway. Knowledge is flattening the organization chart, making our organization more democratic..." Blah, blah, blah. I usually read later that the CEO in this supposedly flat company has engineered himself an ungodly number of stock options.

For thousands of years, knowledge has been associated with hierarchy, and I see no end to that relationship on the horizon. Those who know have power; those who have power will have control over who knows what. Knowledge management is a highly political undertaking. You'll have to tread lightly in giving access (there's that word again) to knowledge to those who formerly lacked it. If you don't, you will almost certainly run afoul of someone powerful to whom your knowledge management activities are threatening.

Now I've probably ensured that no one will ever talk to me about knowledge management again for fear that they'll be told they're stumbling into one of the Seven Pitfalls. I'll be blissfully ignorant, and their problems will continue to occur. But don't say I never told you how to save yourself an embarrassing tumble. **CIO**

Thomas H. Davenport is a professor and director of the Information Management Program at the University of Texas at Austin. He welcomes reader comments at Tdav@notes.bus.utexas.edu.

Get the competitive edge!

YES, please enter my one-year subscription (21 issues) to CIO magazine and bill me later for only \$75, a savings of \$23 off the basic rate!

Name _____

Title _____

Company Name _____

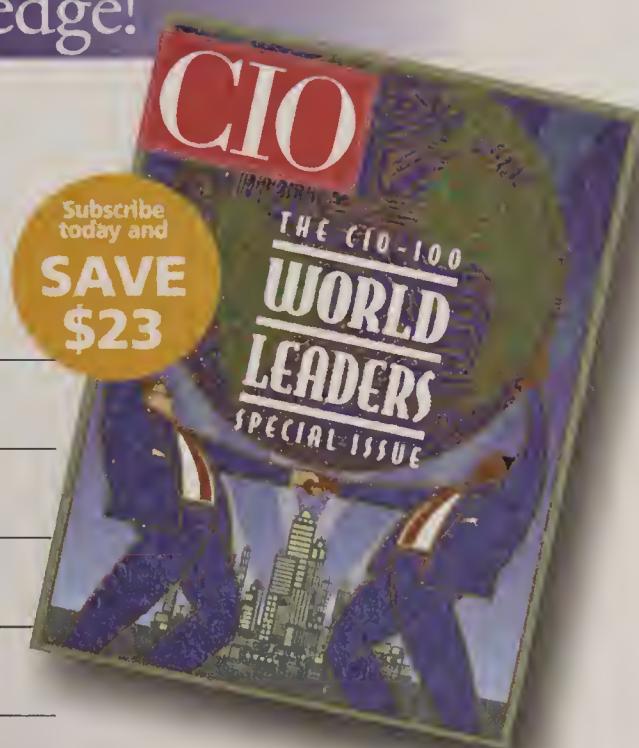
Address _____

City _____

State _____

Zip _____

The basic one-year subscription rate for CIO magazine is \$98. This is a domestic rate only (US and Canada.) The foreign rate is \$110 prepaid in U.S. currency.



INJ7

**New Order --
Process Immediately!**



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

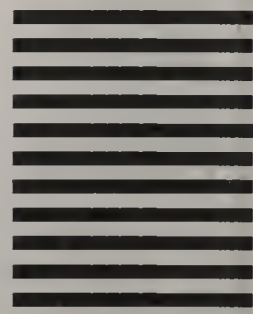
BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO.1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE



ATTN: CIRCULATION DEPARTMENT
PO BOX 9208
FRAMINGHAM, MA 01701-9486



NOW THAT YOU'VE BEEN MENTIONED IN *CIO*, YOU'VE GOT TO DECIDE HOW TO GET THE WORD OUT.



What better way to inform your key customers of your editorial coverage in *CIO* than through customized Editorial Reprints?

Leverage the positive impact of your editorial coverage by using reprints for direct mail campaigns, trade show and seminar promotions, employee communications

and other marketing programs. Let us enhance your reprints with your company's logo, address and sales message. Or, order copies of the complete magazine for marketing and educational purposes.

For information on customized Editorial Reprints in volume quantities, call Bill Kerber at 508-935-4539.

G E N U I N E R E P R I N T S F R O M





*IBM PC 300, with
LANClient Control
Manager, helps you focus
more on your business
and less on your PCs.*



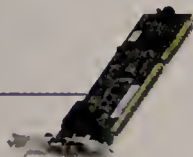
*IBM PC Server
704, with NetFinity,
helps you to easily
manage your network
PCs from your desk.*



*ThinkPad 380 gives
you an affordable way
to take advantage of
the industry's leading
technologies.*



*IBM IntelliStations,
with Wake on LAN, let
you power up multiple
workstations from a
single location.*



*Designed and tested
total solutions with
network, storage
and memory from
Options by IBM.*

Introducing IBM SystemCare, a whole new approach to networked personal computing.





IBM Personal Computing Solutions



For most companies, technology is no longer a cost. It's an investment. A way to get leaner and tougher, and squeeze more business benefits out of finite resources.

Well, at IBM, we have a history of caring not only about better technology, but about better ways of doing business. So rather than just focus on hot specs (which we have plenty of), we'd also like to talk about how you can optimize your personal computing assets.

"Don't just show me computers. Show me ideas."

What if a computer company could tackle IT managers' biggest problems: spiraling costs, risk, threats to control, even obsolescence? What if a computer company was as eager to give you a competitive advantage as it was to build better technology? What if that company was IBM?

Introducing IBM SystemCare.

SystemCare is a portfolio of technology, services and financing, delivered exclusively through IBM Business Partners, which addresses IT management problems at the root level.

"I've got better things to do than chase after our PCs and servers."

The more you're distracted by busy-work, the less time you have to effect real change. That's why a key part of SystemCare is technology provided to help you manage your network.

We deliver the leading tools for PC management: IBM PC Server with ServerGuide, which helps you easily install servers into most network environments; and NetFinity, for management and control.

We led the industry with Wake on LAN and we've moved ahead once again with LANClient Control Manager and Intel's LANDesk® Client Manager.

In addition to providing the power of Intel processors, our Advanced Manageability Alliance with Intel means we are working on new ways to manage networks remotely in the future, too.

"But there's more to technology management than technology."

Networked computing is a critical part of doing business today. That's why IBM and our Business Partners provide a complete range of services,¹ from tech support around

the clock to disaster recovery assistance.

We can also support you with our LAN monitoring and management services, so you can off-load some of your headaches onto us.

"What am I, psychic? How can I ever predict PC costs?"

SystemCare gives you financing and leasing options that help you get network costs under control.

You avoid tying up essential capital so you can provide management with firm cost projections.

IBM SystemCare Technology Exchange² also allows you to update IBM PC hardware anytime after 24 months, thereby making obsolescence effectively an obsolete idea.

"OK, you got me. I want to know more."

For further information, visit www.us.pc.ibm.com or call 1 800 IBM-7255, ext. 5184, for your closest IBM Business Partner.

You'll see that efficient networked personal computing isn't just about technology anymore, it's **just better business.**



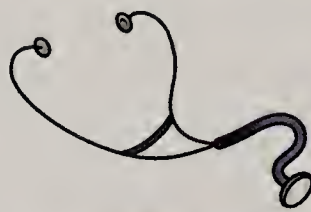
Solutions for a small planet™

¹Planned availability of services varies. ²Financing available from IBM Credit Corporation to qualified commercial, state and local government customers. 36-month term available on hardware; 20% exchange fee on most assets. Rates based on credit, term and options. Other restrictions may apply. Subject to change or withdrawal without notice. PCs referenced in this ad ship with an operating system. IBM, Business Partner, ServerGuide, NetFinity, Wake on LAN, PC 300, ThinkPad, IntelliStation, and Solutions for a small planet are trademarks of International Business Machines Corporation in the United States and/or other countries. Pentium, MMX, the Intel Inside logo and LANDesk are trademarks or registered trademarks of Intel Corporation in the U.S. and other countries. © 1997 IBM Corp. All rights reserved.

the
“how can I
build a business
and a network
with the
same tools?”
solution

Health Care

Overview



Medical Exam

Beset by fierce competition and cost-cutting pressures, health-care providers are relying on IT to help them survive. This special report on the health-care industry looks at how providers are sharing and mining information to improve the health of their patients—and their businesses.

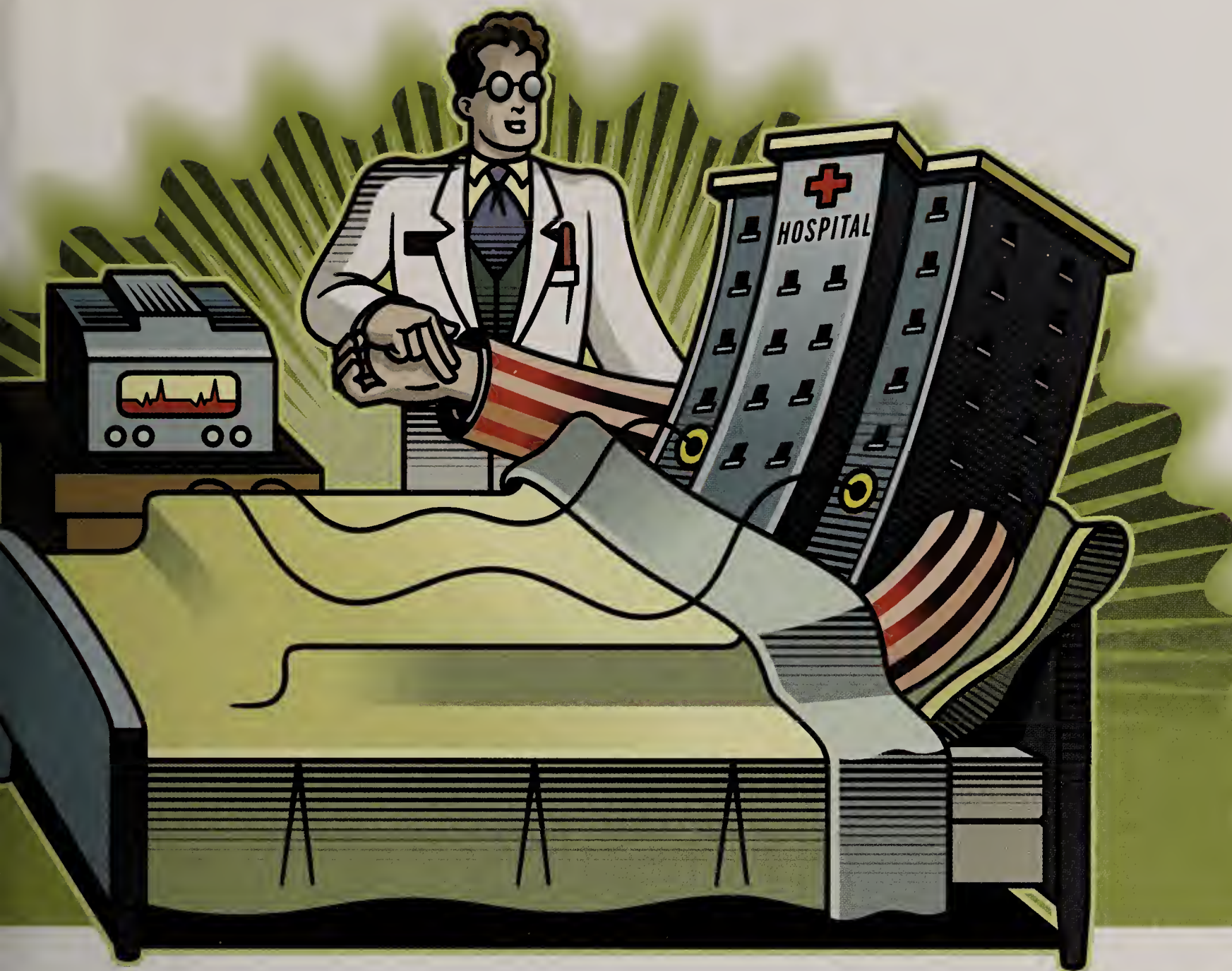
Consider this plot for an episode of television's ER:

County General gets a new computer system linking it to a national network of hospitals. Imagine the comic relief potential. Dr. Greene tries to make sense of the system while the others belittle his lack of computer skills between medical crises. But by the end of the show, everyone understands the value of the system because having access to a tourist's electronic medical record—which reveals that he's deathly allergic to penicillin—helps them save his life.

Perhaps that scenario isn't prime-time material, but it's certainly an improvement over what happens in real life. How many times have you filled out medical history forms in a doctor's office waiting room? Until recently, that rigamarole was necessary because doctors and hospitals couldn't share information. But many health-care professionals foresee a future in which you'll never have to fill out such forms again, because every doctor in America will have electronic access to your updated records.

We all have a vested interest in the transformation of health care. But CIOs in every industry also have a professional reason to monitor the medical industry closely. Historically an IT slowpoke, health-care organizations are not merely catching up; in some cases, they're breaking new ground.

As health-care CIOs navigate the path from backwardness to cutting edge, they face the same pressures besieging other industries—skyrocketing costs, increasingly savvy customers and harsh competition.



"About six years ago, health care was a noncompetitive environment," says Trevor Price, director of health-care consulting at Software Services International Inc., a New York-based consultancy and software developer. "Hospitals didn't compete against each other, because people just went to the one across the street. Now HMOs control huge portions of the population and are negotiating with hospitals for the right to see their patients," Price says. "If an HMO signs up 500,000 people in an area with four hospitals and only selects two hospitals, then the other two could go out of business or get bought."

Added to that crushing competition is the knowledge that every new system or operational change could affect the life of a patient. Talk about pressure.

In this special report, "Managed Share Networks" looks at how groups of hospitals, physician practices and other health facilities—which may or may not be co-owned—are sharing data to sup-

port a full continuum of care. Once integrated, organizations are taking advantage of their combined resources through data mining to improve quality and cut costs. "A Delicate Operation" explores health care's version of data mining, known as "outcomes measurement."

"This is an incredible time of innovation and reengineering for health care," says Jeffrey C. Bauer, president of Hillrose, Colo.-based consultancy The Bauer Group Inc. "Now that the government essentially has walked away from trying to dictate health reform, highly competitive markets are calling the shots for development. We'll see tons of new opportunities and ways to deliver and pay for health care, and IT will be the glue that holds it all together."

An IT revolution in the making may not be suitable for Must See TV, but it certainly qualifies as a must-watch situation for CIOs in all industries.

—Jennifer Bresnahan, Staff Writer

What You'll Learn

This report explores how health-care organizations are linking once-independent entities to share and mine information.

A Delicate Operation 44

- Data mining's business benefits
- Security strategies and privacy issues
- Building end-user support for changes suggested by data mining

Managed Share Networks 58

- How to bridge disparate systems and link remote users
- Using IT to minimize merger stress

Trendlines 20

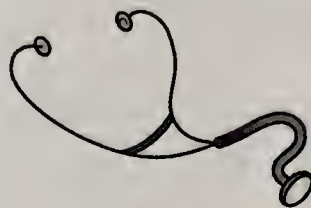
- Electronic House Calls
- Health-Care Delivery

Health-Care Resource Center

- For more stories, research and relevant links, visit www.cio.com/forums/healthcare.

Health Care

Data Mining



A Delicate Operation

Lives may not hang in the balance of your company's data mining efforts. But the experiences of those in the business of curing patients could help you come up with a prescription for a healthier business.

BY JENNIFER BRESNAHAN

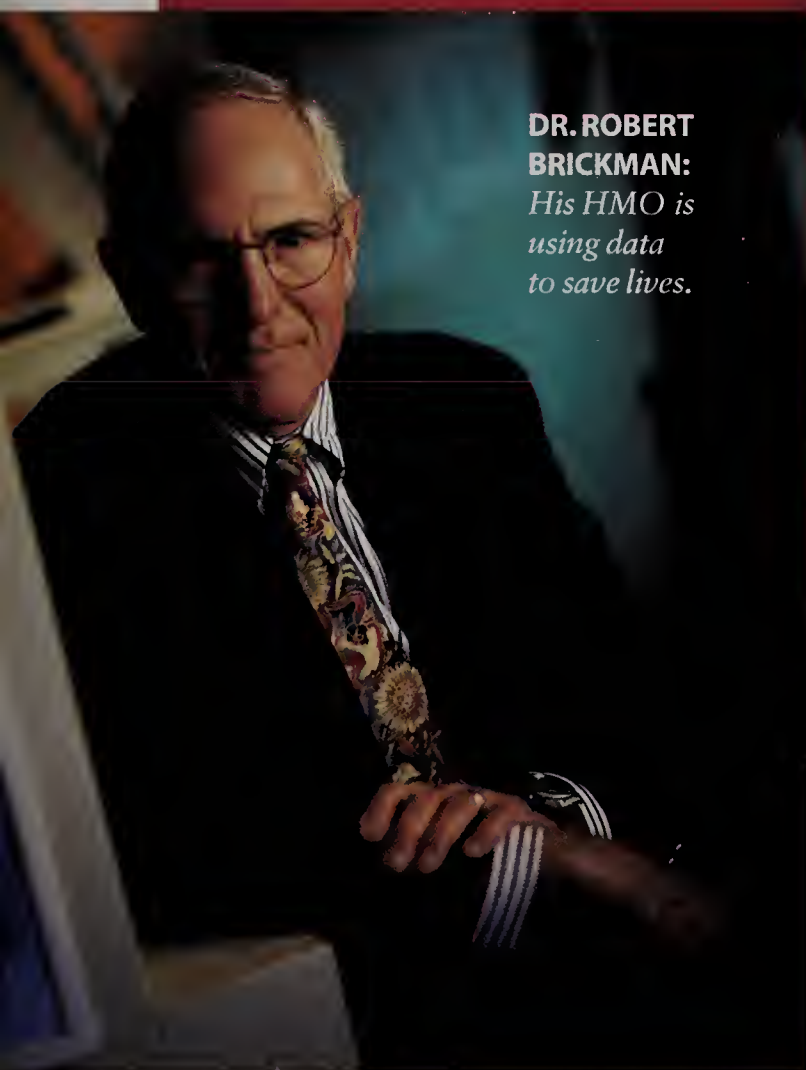
In the grand scheme of things, 12 percent of anything isn't much. It's a dime and some pennies out of a dollar, the merest sliver of a whole pie. But when 12 percent describes a group of people dying, the figure suddenly looms ugly and huge. That's the percentage of pneumonia patients at Norfolk, Va.-based HMO Sentara Health System who died in 1993 and 1994. Although lower than the national average of about 14 percent, the number still seemed too high to Sentara's doctors. What's more, a good many other pneumonia sufferers developed complications requiring expensive antibiotics and an average stay of two weeks, as opposed to the optimal three- to five-day stay of appropriately treated pneumonia patients without complications, says Dr. Robert D. Brickman, Sentara's medical director of clinical effectiveness.

The doctors at Sentara always knew something was wrong. When they ordered sputum cultures for pneumonia patients, they wouldn't hear back from the lab for several days—if at all. Without lab results, they could only guess what was wrong and

how best to treat it; meanwhile, patients got sicker as they waited for results. Yet it wasn't until Sentara's quality improvement team began an exploratory mining foray into claims data in its Oracle-based data mart that the doctors' suspicions



BERT REESE:
*Data mining
can help reduce
variation around
best practices,
improving the
quality of care.*



**DR. ROBERT
BRICKMAN:**
*His HMO is
using data
to save lives.*

were confirmed. Besides uncovering the high pneumonia mortality and complication rates, the team noticed that doctors were ordering sputum cultures many times for the same patient; upon inspection, they learned that the doctors did so in hopes that at least one test would yield

useful, timely information. The quality team quickly devised a new system of transferring the culture from the patient to the lab, and the lab results back to the doctor within two hours. Not only did the mortality rate for all pneumonia patients fall to 9 percent, but the average stay dropped to one week and the cost of managing a single pneumonia case decreased by \$2,000. "Attack the quality of health care, and amazingly the costs come down as well," says Bert Reese, Sentara's corporate director for information systems.

The process that led Sentara to improve the quality and efficiency of care for its pneumonia patients is known in the health-care industry as "outcomes measurement." A form of data mining—a means of searching for previously unknown, actionable information from large databases—outcomes measurement involves examining clinical encounter information, insurance claims and billing data to measure the results of past treatments and processes. By understanding what worked—or didn't—providers can identify areas for improvement or capitalize on successful methods.

PHOTOS ABOVE AND LEFT BY GEORGE SIMIAN

SPECIAL REPORT ON HEALTH CARE: DATA MINING

Because outcomes measurement (also known as outcomes analysis) can influence whether patients live or die, it's no wonder the health-care industry is emerging as a leader in data mining. CIOs in other industries don't deal with data of life-or-death importance (although sometimes it may seem that way), but they can still apply the wisdom of their health-care colleagues to their own data mining operations to cut costs, improve efficiency and ensure customer satisfaction. And since many of the issues and problems associated with outcomes measurement apply to data mining, CIOs can benefit from learning how their health-care counterparts address such perennial problems as end-user buy-in and security.

"The business of practicing medicine is so complex that it pushes the sophistication of data mining tools," says Brad L. Armstrong, global managing director of Deloitte & Touche Consulting Group's Health Systems Integration practice in Los Angeles. "There are thousands of services, relationships built over time, and multiple diagnoses and interactions. That complexity will continue to push progressive data mining applications that will rival those in banking or retail."

Applications of data mining in the health-care industry are widespread. One way data mining is helping health-care providers cut costs and improve care is by showing which treatments statistically have been most effective. For example, once hospital administrators recognize that stroke patients are less likely to develop respiratory infections if they can swallow properly, they can educate their physicians and institute a standard policy to identify and provide therapy to those who have difficulty swallowing. Outcomes measurement also helps HMOs evaluate their doctors and facilities. Physicians and hospitals benefit from knowing how they compare with their peers, and the parent company saves money by getting all of its employees up to par. (Incompetent doctors are an expensive liability because high-quality preventive care is much more cost-effective than correcting a mistake later in the emergency room.) Along the same lines, outcomes measurement also lets caregivers identify people statistically at risk for certain ailments so that they can be treated

before the condition escalates into something expensive and potentially fatal. Fraud detection is yet another outcomes analysis application: When administrators compare the volume of lab tests ordered by physicians, evidence that a doctor is ordering too many unnecessary tests would leap off the page. Finally, providers are using data mining to cross-sell and market new products and services. An allergy sufferer who has tried a variety of treatments without success, for instance, might be receptive to alternative herbal or acupuncture treatments.

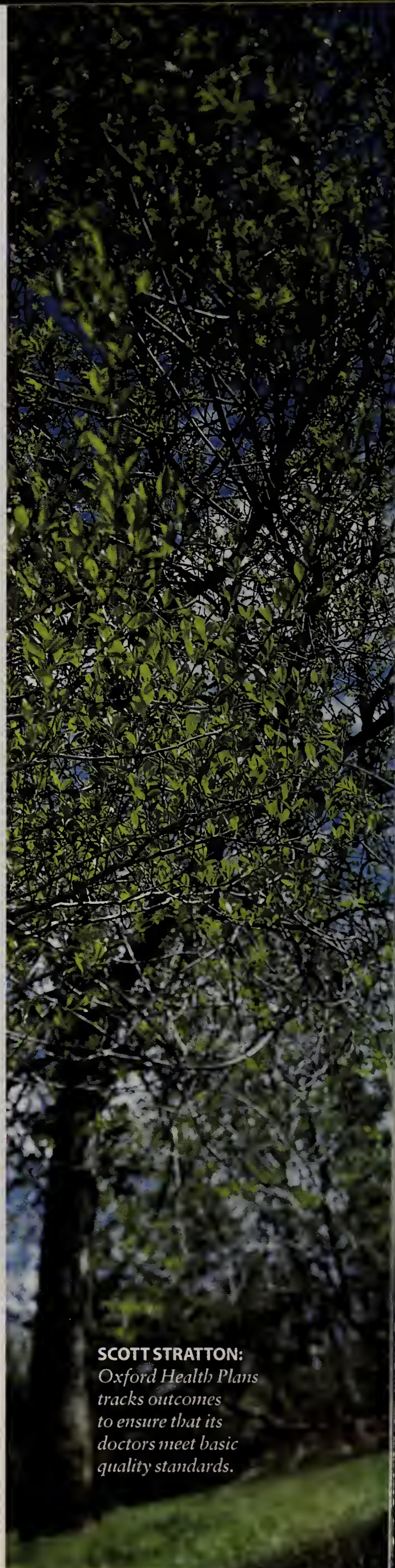
**"STUDIES HAVE SHOWN
THAT AS MANY AS ONE-THIRD
OF ALL MEDICAL
INTERVENTIONS DO NOT LEAD
TO AN IMPROVEMENT IN
PATIENTS' CONDITIONS.
OUTCOMES DATA WILL FINALLY
ALLOW US TO WEED OUT
THE RESOURCES
THAT AREN'T MAKING
PEOPLE BETTER."**

-Jeffrey Bauer

"Information has become the most valuable commodity in health care," says Jeffrey C. Bauer, president of Hillrose, Colo.-based consultancy The Bauer Group Inc. "In the past, studies have shown that as many as one-third of all medical interventions do not lead to an improvement in patients' conditions. In other words, about 33 cents on the dollar is spent on services that do not demonstrably make the patient better off. But today we can afford to provide only productive interventions. Outcomes data will finally allow us to weed out the resources that aren't making people better."

In the case of Sentara, outcomes analysis is helping decrease variability of treatment among its five hospitals, 180 doctors, nine nursing homes, nine urgent care centers and nine Navy outpatient clinics. "The way you eliminate error is to homogenize and standardize so [that things are] done the same way every time, on time," explains Brickman. A team of hospital administrators and doc-

SCOTT STRATTON:
*Oxford Health Plans
tracks outcomes
to ensure that its
doctors meet basic
quality standards.*





tors scours Sentara's data mart with Orlando, Fla.-based MedAI Inc.'s decision-support software, looking for the most effective and least expensive treatments. Their recommendations are passed on to the rest of the staff. "If we can reduce variation around the best practice, we can improve quality of care and the outcomes," says Reese.

Defining the Focus

As with any large data warehousing and mining endeavor, the degree to which an organization reaps the benefits of outcomes measurement depends on how its IS executives resolve a host of issues. For instance, one of the biggest strengths of outcomes measurement—the ability to view data in the aggregate—can be a pitfall if it discourages consideration of cases on an individual level. "Any time

Making the Grade

AS IF THERE WEREN'T enough acronyms floating around, now there's HEDIS, the health-care version of ISO 9000. Set by the National Committee for Quality Assurance to help employers choose between HMOs, the Health Plan Employer Data and Information Set measures such factors as what percentage of young children in an HMO's network are fully immunized or how many men have had cholesterol screenings. Norwalk, Conn.-based managed care provider Oxford Health Plans relies on outcomes measurement to verify that its physicians are adequately performing basic services. If a particular pediatrician has a month of poor outcomes, for example, the medical analysis team inspects whether the doctor is giving preventive immunizations. If he is not, a team member contacts the doctor and even sends letters to the patients' parents urging them to make appointments, says Scott D. Stratton, director of Oxford's medical analysis group.

PHOTO BY CHRIS CASABURI

SPECIAL REPORT ON HEALTH CARE: DATA MINING

you make broad, generalized statements about data, you're liable to miss specific cases," says Armstrong. "In banking, retail or any kind of business, it's dangerous to make assumptions about customers' needs based solely on common characteristics they possess." In the medical field, overemphasizing aggregate data can have dire consequences for a patient. A doctor relying on clinical practice guidelines based on statistical analysis of outcomes might never think to check for glaucoma in a 29-year-old patient, because it's not standard procedure, explains Wayne Farnsworth, assis-

tant professor of emergency medicine at the State University of New York's Health Science Center at Syracuse.

Exacerbating that danger is the need of many large organizations to reduce all symptoms and descriptions to the lowest common denominator to make data mining work. Every hospital has its own system for coding and record-keeping, which can cause difficulties when they attempt to merge their data. If one hospital records patients' gender as "M" or "F" and another uses "1" or "2," the data doesn't match and therefore can't be mined. Most providers are avoiding definition differences by sticking with standard ICD-9 codes, the international categorization of outcomes that assigns a code number to every health problem. But ICD-9 codes are too shallow to be of much value, says Trevor Price, director of health-care consulting at the New York-based consultancy and

"ANY TIME YOU MAKE BROAD, GENERALIZED STATEMENTS ABOUT DATA, YOU'RE LIABLE TO MISS SPECIFIC CASES. IN ANY KIND OF BUSINESS, IT'S DANGEROUS TO MAKE ASSUMPTIONS ABOUT CUSTOMERS' NEEDS BASED SOLELY ON COMMON CHARACTERISTICS."

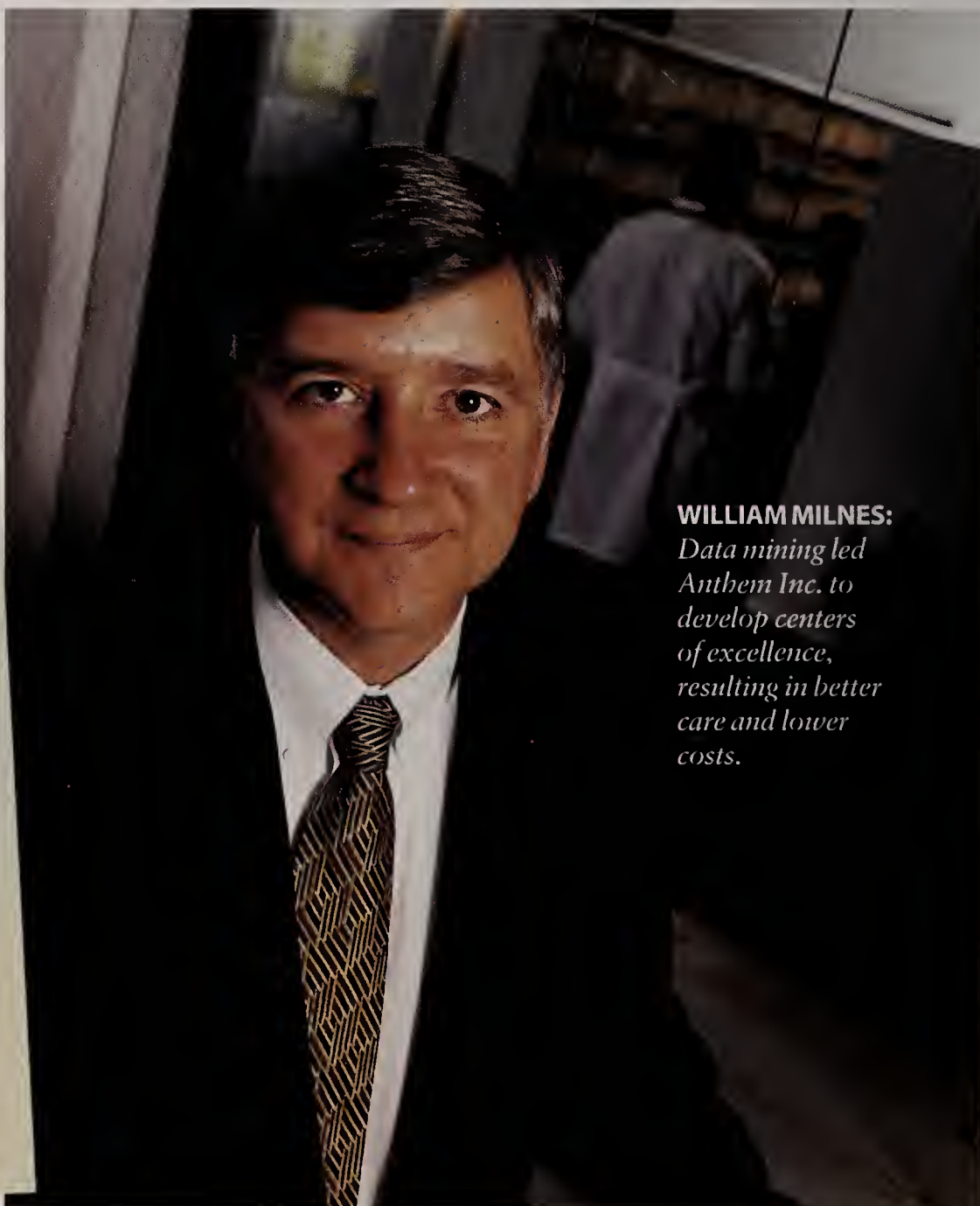
—Brad Armstrong

software developer Software Services International Inc. (SSI). "That's not good enough, because you have no idea what was done 10 steps before and after that ICD-9 code was classified," says Price.

Yet for many organizations, settling for

Avoiding Merger Bloat

WHEN IT COMES TO BEATING the competition, bigger is often better. But companies that acquire new businesses without streamlining their combined resources can fall prey to that state of inefficiency and waste known as "merger bloat." Indianapolis-based Anthem Inc. was at risk for the dreaded disease after going through three mergers in three years with companies worth \$1.5 billion to \$2 billion each. But mining the combined data in its 1.3 terabyte NCR Teradata database helped the \$6 billion health insurance company target areas to trim—such as coronary artery bypass, a common but expensive and risky procedure. Eighteen different hospitals within a region of Ohio were performing bypasses, but the variation in outcomes among them was striking. Anthem chose five hospitals as centers of excellence and shifted over all of the bypass patients in the region to them. As a result, costs fell dramatically and the mortality rate was reduced from more than 4 percent to less than 1 percent, says Anthem's senior vice president, William R. Milnes Jr.



WILLIAM MILNES:
Data mining led Anthem Inc. to develop centers of excellence, resulting in better care and lower costs.

PHOTO BY WILBUR MONTGOMERY

Year 2000, a.k.a. The Immovable
Deadline. It could cost millions
in man-hours and lost revenues.

Unless you have EMC Enterprise

Storage.[™] Because EMC Enterprise
Storage helps you become Year
2000 compliant without pro-
tracted business interruptions.

Our solutions can maintain com-
pletely separate production and
test data simultaneously. This will
allow you to validate your Year
2000 solution with real informa-
tion, without putting your busi-

ness at risk. To find out how

EMC Enterprise Storage can

help solve the biggest IT

crisis ever and upgrade the per-

formance of your entire system

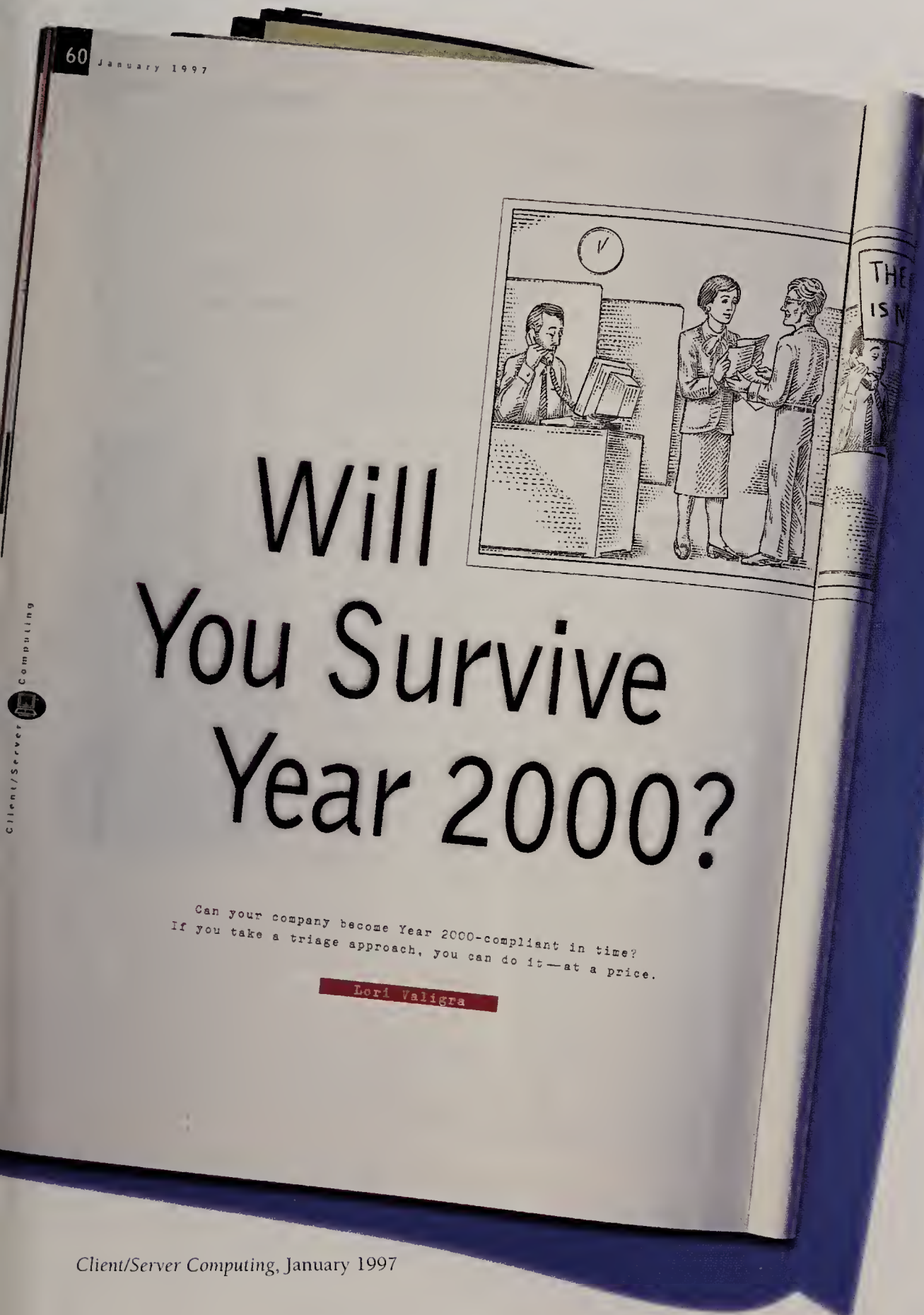
***Not Without
EMC Enterprise
Storage
You Won't.***

during and after the project, visit

our Web site at www.emc.com or

call 1-800-424-EMC2, ext. 372.

EMC²
The Enterprise Storage Company



Client/Server Computing, January 1997

SPECIAL REPORT ON HEALTH CARE: DATA MINING

the bare minimum is preferable to trying to get everyone to agree on a common set of definitions—the scourge of IS professionals everywhere. People's natural instinct to protect departmental turf can jeopardize the whole project, as was the case for a large insurance company that recently spent more than \$1 million in 14 months on a data warehouse before

killing the project because its five lines of business couldn't agree on the definition of "product," according to Alan Paller, director of research and education at The Data Warehousing Institute in Bethesda, Md. But there are ways around the data standardization standoff. Melville, N.Y.-based home health organization Olsten Health Services, for instance, assigned a

representative from IS, a "czar of nomenclature," to hammer out terms between IS and the physicians, says William C. Reed, Olsten's senior vice president and chief information and administrative officer. Health Resources Group (HRG), a national chain of dialysis clinics based in Santa Ana, Calif., relies on highly detailed pop-up menus built into SSI's Homer data mining tool. Nurses at the point of care choose the appropriate symptoms and conditions from an extensive list. The level of detail afforded by the pop-up menus makes the aggregated data all the more useful for mining.



WILLIAM REED: *At Olsten Health Services, a "czar of nomenclature" worked with doctors and IS staff to develop a common set of medical terms that would enable data mining.*

Future Perfect

EVERYBODY KNOWS that running out of the one item clients really want is a major customer service no-no. In the health-care industry, however, running out of a critical medicine at the wrong time can mean the difference between sickness and health. That's why Melville, N.Y.-based home health organization Olsten Health Services mines its data to predict what products and services it will need in the future based on utilization patterns from the past. Knowing, say, that hemoglobin levels of diabetics are higher in August than in December tells Olsten to stock an adequate supply of drugs and personnel in the summer.

"Other products that we distribute are life-critical," says William C. Reed, Olsten's senior vice president and chief information and administrative officer. "We can't be off by more than 15 minutes." Ultimately, Olsten plans to expand its use of data mining. "Our goal is to make this tool into a utility just like a socket in a wall that everyone can set up and use intuitively," says Reed.

PHOTO BY CHRIS CASABURI

Separated at birth?™



The hard-selling but always approachable Phil White of Informix...



and Sun's don't-approach-'til-he's-had-his-jolt-of-java technologist, Greg Papadopoulos?

Informix & Sun

Sun and Informix. We've been together so many years, you'd swear we were related. In fact, thousands of companies have purchased Informix products on Sun™ systems. And we've linked our engineering, service and support teams to deliver leading performance and customer satisfaction. And now that Informix has adopted Java™ across its entire product line, you'll be able to manage and use information in new and innovative ways. Just another example of how we're working together to offer your business true mission-critical solutions. Not just promises. But then that's what true alliances are all about. To find out more, contact us at www.sun.com/sepcio or www.informix.com. **THE NETWORK IS THE COMPUTER™**



Collecting the Right Data

The quality of the outcomes measurement analysis also depends on the type of data being examined. In health care, the information available for mining typically is financial in nature because the return on investment for collecting such data has been most obvious, says Brickman. Somewhere along the way, people realized that billing and claims data could be mined for clinical purposes. But some critics argue that outcomes analysis based on claims data is of limited value. Mining claims data might indicate that a patient had a lab test, but to see the results of the test, a doctor would have to read the patient's paper medical file, says Brickman. "The financial data can just suggest areas to look at," he explains. "It can measure

**"THIS IS NOT ABOUT GOOD
AND BAD DOCTORS;
IT'S ABOUT GOOD
AND BAD PROCESSES."**

- Bert Reese

[mortality] and whether a patient received a drug, but the further you drill down, the less reliable the information."

As more health-care providers invest in computerized medical records that will make clinical data more accessible, outcomes analysis for clinical insight will become more reliable, says Bauer. But that shift will be slow and expensive, costing about \$35 million to \$50 million for a billion-dollar organization like Sentara, says Brickman. And insurance companies aren't in any hurry. "A lot of payers say they want outcomes information, but at the bottom line, clinical outcomes [analysis capability] is secondary and may or may not be paid for," says Reed. "Cost is still the number-one driver."

Yet a few forward-thinking organizations, Olsten included, are moving beyond collecting financial information. Those providers tend to view data warehousing, data collection and medical equipment not as separate projects but as components of a cohesive, overarching IT strategy. HRG, for instance, has a wealth of clinical data available for data mining because its dialysis machines automatically collect such data as

a patient's blood pressure while the patient is being treated and transmit it to HRG's Sybase data warehouse.

Balancing Privacy and Access

Any time an organization deals with consumer data, privacy and security become paramount. That is especially true in the health-care industry where the data in question is highly sensitive. To protect themselves and their patients, some health-care organizations have developed exemplary security strategies, says Bauer. "The fact that there is no national scandal, no outraged patients, shows that the health-care industry is doing something right that the government and banks can learn from," he says. Aside from building firewalls and encrypting data, some health-care providers safeguard patient data by limiting who has access to it. Sentara, for instance, includes patient identifiers in its data warehouse but lets only a team of about six doctors and administrators look at the data. If other doctors have a query, they must submit it to the quality improvement team. "The doctors can't access the information, because it has to be confidential," says Brickman. "Every plaintiff's attorney would love to get his hands on this information [for malpractice suits]. It can be protected from discovery only if it's kept private."

Intermountain Health Care, an integrated health-care system in Salt Lake City, sidesteps the security issue altogether by stripping its databases of any patient identifiers. Only an account number is used to link elements of a patient's record, stored in six Oracle data marts. Leaving the data anonymous ensures that any of Intermountain's 20,000 or so employees can access its riches through the company's intranet, says Data Warehousing Project Leader Ping Wang. Doctors mine Intermountain's Oracle database themselves using Netscape or Microsoft Explorer browsers to answer what-if questions and determine the most appropriate treatments.

Removing patient identifiers from the database makes sense for organizations

interested in looking at their data in the aggregate. But it also limits what can be accomplished with the data. If no names are included, providers cannot find and alert patients whose lab results or vital signs deviate from the norm, indicating that they are at risk for certain medical conditions. Because Norwalk, Conn.-based managed-care provider Oxford Health Plans' database does include patient identifiers, Oxford's medical analysis team can refer problems it finds to the disease management program team, which alerts the affected patients' physicians. Omitting patient identifiers also rules out the kind of real-time decision making in practice at HRG. If a problem arises while an HRG patient is undergoing dialysis, nurses can use SSI's Homer software to compare the patient's real-time data with that of other HRG patients who have had similar problems



PING WANG: At Intermountain Health Care, patient data is stored anonymously so that it is available for all doctors to mine.

to find the best solution, says the company's president, Cynthia Jansen.

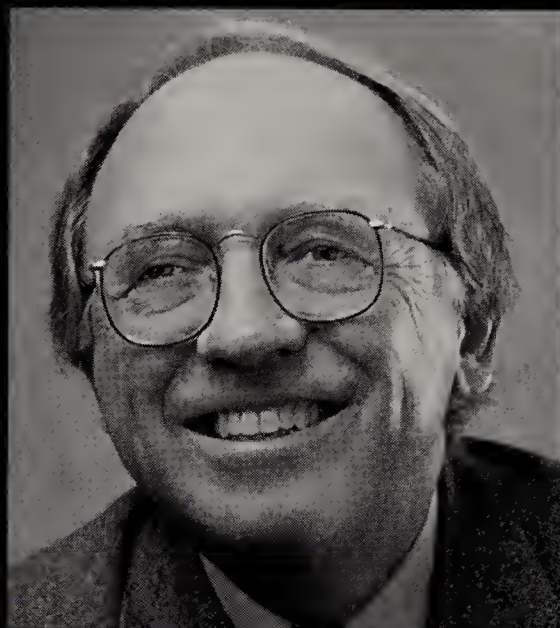
Cultivating User Buy-In

Getting buy-in from the end user can be another thorny area for IS executives implementing a data mining project. Convincing users in marketing, HR or out in the field (be it branch office employees or doctors in a hospital) to surrender peacefully their standard modes of operation for a new technology is never easy. Doctors might be

Separated at birth?™



Sports car enthusiast Doug Percy of
Geac SmartStream...



and sports memorabilia collector
Joe Roebuck of Sun?

G e a c S m a r t S t r e a m & S u n

Sun and Geac SmartStream. Related? When it comes to offering your business real solutions, we are. Geac initially developed its first Java applet exclusively on Sun. And Geac SmartStream continues to design Java applets for peak performance on Sun, giving customers access to information at lower cost. In addition, SmartStream® applications running on Sun hardware get a boost in performance and efficiency. Together, Geac and Sun have created solutions for some of the biggest names in the Fortune 500, as well as some of the world's fastest growing "up-and-coming" businesses. But what can we offer you? Increased productivity and speed that can change the way you do business. With swift, cutting-edge results. Which is, after all, what our little family is all about. For more information, visit us at www.sun.com/sepcio or www.geac.com. **THE NETWORK IS THE COMPUTER™**

Geac
SMARTStream

 **Sun**
microsystems

Reaching for Help

Plenty of vendors stand ready to help health-care providers mine their data. Here are some pros and cons of relying on outside assistance.

COMPANIES BALKING AT THE MONEY and skills needed to develop advanced data mining tools have the option of paying someone else to build the tools—or even to mine the data—for them. Outsourcing all or part of the data mining process can be less expensive and time-consuming than handling it in-house. Such vendors as Mitchell Field, N.Y.-based CrossZ Software;



SUE ESLECK: “You can’t outsource outcomes measurement totally.”

HealthShare Technology Inc. in Acton, Mass.; Philadelphia-based Care Management Science Corp. (CMS); and The Medstat Group in Ann Arbor, Mich., offer ready-made databases of publicly available medical information that hospitals can mine at will. Often, those outsourcers also will integrate a provider’s internal data with their own databases. And the fact that outsourcing vendors have other customers

can be an added benefit: Organizations that farm out their data mining can foster working relationships with other customers and compare their data.

One hospital that turned to outside help is Birmingham, Ala.-based Brookwood Medical Center. Brookwood built its own data warehouse from a variety of different inter-

nal sources in the late 1980s but decided to supplement its data mining efforts by using CMS and other vendors, says Sue Esleck, administrative leader for care continuum. “I didn’t feel like we could satisfy our physicians by trying to grow that in-house,” says Esleck. “They were far too sophisticated and required real, proven data.” Brookwood sends semiannual data feeds to CMS, which runs the data through algorithms to reveal reasons behind the outcomes. For example, although the death of an elderly patient who had already suffered two strokes was probably unavoidable, the death of a young, previously healthy patient might suggest a problem with a doctor or process at Brookwood. CMS then sends the risk-adjusted data back to Brookwood ready to be mined. In addition, CMS technology lets Esleck drill down into the daily level of care instead of looking at an entire hospital stay. And she has developed a phone relationship with a fellow CMS customer in Pittsburgh. When questions arise about outcomes measurement, Esleck simply gets on the phone for a collaborative tête-à-tête. Eventually, the data CMS sends will include information from other hospitals, making external comparisons possible, says Sammy Cantrell, Brookwood’s CIO.

But there are inherent dangers in settling for a quick data mining fix. The perceived cost savings may be misleading; companies can end up spending as much as \$1 million a month, says Mark Brown, program manager for data mining and applied analysis at the Cary, N.C.-based decision-support software vendor SAS Institute Inc. And companies that outsource everything lose control of the process. They often miss the real story behind the data upon which they base their big business decisions. “If you don’t understand how it all takes place, you’re making a mistake because you might need to explain it to the CEO someday,” says Robert S. Brown Jr., a doctor at the University of North Carolina at Chapel Hill School of Medicine.

“You can’t outsource outcomes measurement totally because you’ve got to understand what you see,” adds Esleck. “Somebody in-house has to be able to take the reported information and apply it to determine what needs to be changed. Otherwise it’s just data.” —J. Bresnahan

even less tolerant to forced change than most users because they’re accustomed to a high degree of professional autonomy. “The doctors were nervous at first about being compared because they saw their reputations at stake,” says Brickman of Sentara’s data mining efforts. “They believe they graduated from medical school and should be allowed to make their own decisions.”

One way to foster user acceptance is to keep the data model as simple and easy to understand as possible. End users—doctors included—will never agree to change their procedures if they don’t

understand how the system works. “If I make the model very complex and intricate, how do I expect a novice with no IS background to do a query?” asks Reed.

But the surest way to circumvent end-user resistance in this and all other major IS initiatives is to include users from the beginning and listen to their feedback. Reese’s strategy of proving the concept with a real-life example also can’t hurt. After seeing the value of data mining for pneumonia patients, the Sentara doctors embraced the concept. “This is not about good and bad doctors; it’s about good and bad processes,” says Reese.

“The premise is that physicians want to help patients. If you can convince the doctors that something’s good for the patients, then you’re OK.”

And, as it turns out, so are the patients. In time, data mining could render obsolete statistics like the 12 percent pneumonia mortality rate at Sentara. And if it can help hospitals save more lives, just imagine what it could do for your manufacturing plant or customer service center. **CIO**

Staff Writer Jennifer Bresnahan can be reached at jbresnahan@cio.com.

Separated at birth?™



SAS Institute's Jim Goodnight, who gives customers a vote in product development...



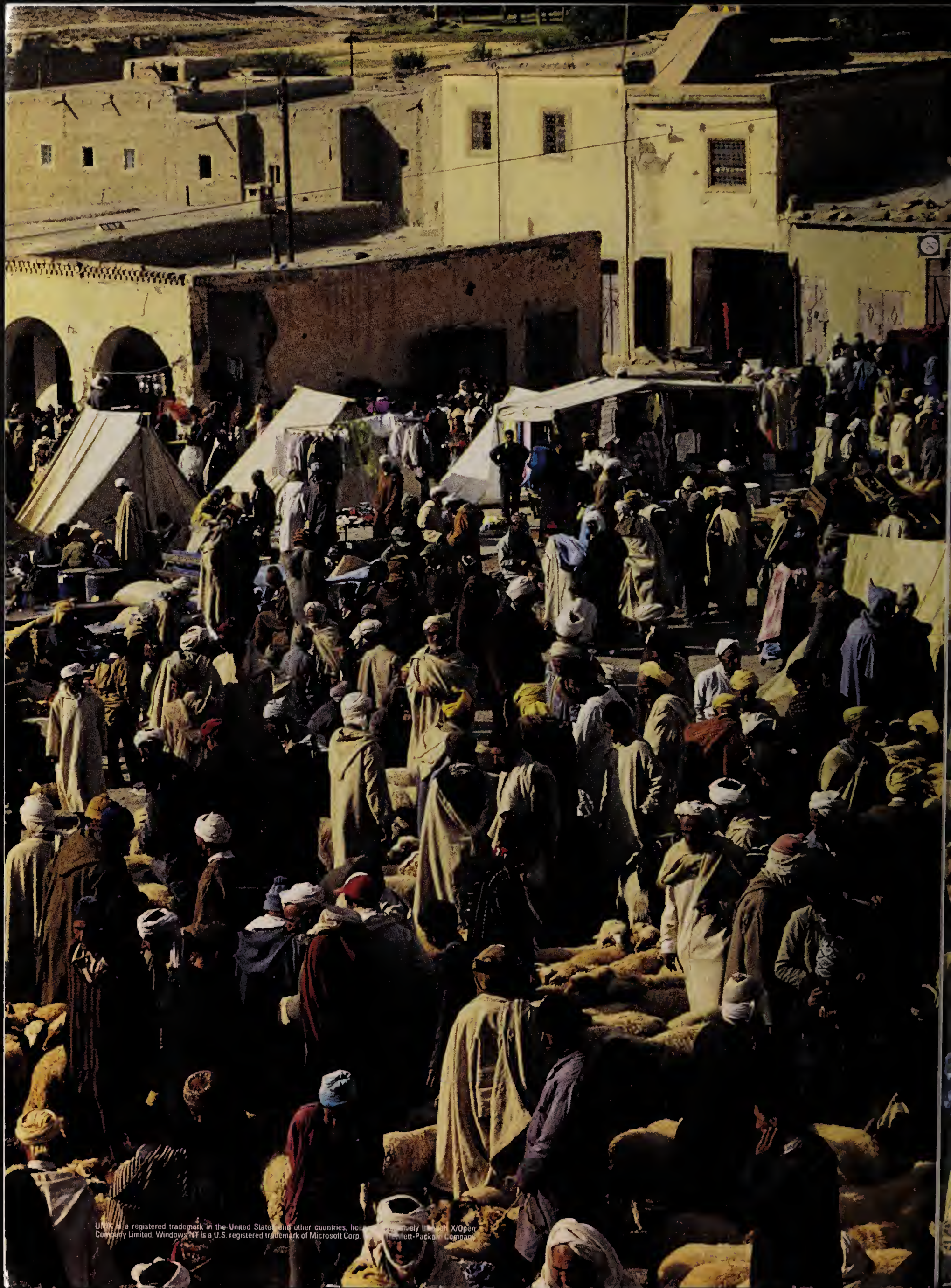
and Sun's Neil Knox, who believes that someday everyone will vote by e-mail?

SAS Institute & Sun

Sun and SAS Institute. Related? We might as well be. For the 7th year in a row, Sun is the open systems platform of choice for SAS® software users. Together, we deliver proven applications and the most current and innovative technology this side of anywhere. A combo that results in real business solutions, like the SAS Scalable Performance Data Server™. It allows customers to take full advantage of scalable SMP architecture in their data warehouse, and it's only available on Sun. SAS Institute and Sun also jointly staff Customer Technology Centers to give SAS software the full potential of Sun™ systems. So you have the ultimate products and solutions for your diverse business environment. Which is, after all, what this alliance is all about. To find out more, contact us at www.sun.com/sepcio or www.sas.com/ **THE NETWORK IS THE COMPUTER™**

SAS
SAS Institute Inc.

Sun
microsystems



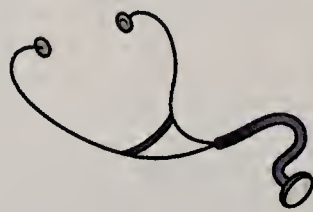
UNIX is a registered trademark in the United States and other countries, licensed exclusively to Hewlett-Packard Company. Windows NT is a U.S. registered trademark of Microsoft Corp. © 1995 Hewlett-Packard Company



Everyone is out there hawking the platform they have. Is there anyone who has both? Step into our tent. HP Domain Internet Servers are the most scalable, manageable and secure solutions for both UNIX® and Windows® NT. Regardless of your environment, we can help your company thrive on the net with HP consulting, education and support. Talk to us. Our marketplace is at www.hp.com/go/domain Capitalize on chaos.

Health Care

Information Infrastructure



Managed Share Networks

If your health were at stake, you'd hope that health-care providers would willingly collaborate to get you on the road to recovery. But information sharing in the health-care sector often is thwarted by competitive pressures. Here's how three health-care organizations are overcoming the obstacles to effective information sharing.

BY TOM FIELD

When President Clinton named health-care reform a top priority of his first term, he envisioned a national information infrastructure upon which health-care entities everywhere—physicians, hospitals, insurance companies—would share their patients' clinical and financial data. Surmounting geographic and competitive barriers to build such a network would be a challenge, but if successful, health care could set an information-sharing benchmark for all industries to meet.

But, like health-care reform itself, a victim of its price tag and partisan politics, the national health information network has yet to happen.

Which is not to say no one has tried. Health care, like many other industries, has seen a flurry of mergers, acquisitions and partnerships in recent years, and health-care organizations have plied IT to forge new connections. Their successes—and failures—are instructive to any IS executive charged with linking once-competitive or independent enti-

ties into a cohesive, networked whole.

Amid the initial scurry for reform, health-care providers attempted to form community health information networks (CHINs) to unite regional payers and providers in miniature versions of Clinton's proposed health-care network. A noble objective, but the effort fell flat. With few exceptions (see profile of the Wisconsin Health Information Network, Page 60), the major CHIN attempts failed for reasons familiar to CIOs in any industry: a lack



MICHAEL JORDAN: WHIN is meeting financial objectives, thanks to a steady stream of income from the hospitals, physicians, payers and other health-care agencies that subscribe to it.

of common IT standards, disagreements over funding issues and, most often, the reluctance of CHIN members to do *any* kind of business with their competitors. "Think about it logically," says Del Richmond, a health-care industry analyst for CJ Singer, a Gartner Group Inc.-owned consultancy in Wakefield, Mass. "These people compete for patients daily—they're going to *share*?"

The next networking effort came out of the managed-care movement, which advocates providing a "continuum of care," or affordable, cradle-to-grave health care through a single group. As managed-care organizations acquired hospitals, physician practices and other health-care facilities to offer that breadth of services, they created conglomerates

known as integrated delivery systems (IDSs) whose primary objective is to move patients seamlessly through their full-service facilities. But to succeed, the organizations needed to create information infrastructures—IDS networks—that enable them to operate essentially as CHINs under one corporate roof. Ideally, IDS patients provide their medical histories and insurance information only once; thereafter, their clinical and financial records are available to any authorized user within the IDS. Since 1994, the number of IDSs in the United States has swelled from 61 to 350, according to Richmond. He attributes the growth to the increase in hospital and other health-care provider mergers, such as those that created BJC Health

System in St. Louis, and the advent of such health-care powerhouses as Columbia/HCA Healthcare Corp. of Nashville, Tenn. (see profiles, Page 64).

IDSs don't face all of the same obstacles as CHINs—they *can* impose IT standards and information flow among their entities. But some of the challenges that did CHINs in still must be overcome:

- Lack of a turnkey solution to enable information sharing. No single vendor offers a product line to meet all health-care information needs, forcing organizations to build their own systems or mix and match with multiple vendors.
- Inability to agree on a standard patient identifier. The biggest impediment to sharing health-care data among sepa-

rate entities may be the lack of consensus within the industry over whether patients should be identified by name, Social Security number or some other description. Successful IDS organizations have imposed their own standards.

■ **Security.** Patients' and providers' anxieties about electronically transmitting sensitive medical records persist. To address those concerns, IDS organizations have created strict authorization and accessibility standards (see "Access Control," below).

The federal government may remove some of those challenges, however. In August 1996, the president signed the Health Insurance Portability and Accountability Act, which mandates that health-care providers adopt a single set of national standards for the electronic transfer of health information and calls for the government to pass appropriate privacy legislation within three years. If Congress enacts privacy standards and if the number and quality of IDS organizations continue to increase, then inde-

Access Control

Medical records are among the most sensitive data around, so tackling the security issue is a top priority for health-care organizations

AN AIDS PATIENT WORRIES that anyone with an Internet connection will be able to access her electronic medical record. A man diagnosed with a rare digestive disorder is afraid that the doctor he visits for a second opinion will simply call up an electronic file and rubber-stamp the first doctor's findings. A physician who handles complicated cases frets that his success rate could be misconstrued by insurance providers.

Security risks are the bugaboos of health information networks. Here is how two networked health-care organizations deal with those and other security issues:

■ **BJC Health System, St. Louis**

Outside access to the BJC network is barred by a firewall. All internal users are subject to strict sign-on and password controls, and their access is limited to information relevant to their jobs. Primary care physicians, for example, have full access to their own patients' records, but consulting physicians or nurses have limited access. If users try to exceed their access levels, screen warnings flash at them. Given legitimate reasons to proceed—say, a primary physician asks a colleague to review a patient's case—users can access the information they need, but all network activity is logged and audited electronically. Unauthorized infiltration is subject to disciplinary action.

■ **Wisconsin Health Information Network (WHIN), Brookfield, Wis.**

Patients within the network must authorize electronic transmission of their records, and users can connect to the network only by entering private user IDs and passwords (which they are required to change every 60 days). All data requests and responses are encrypted, and WHIN subscriber sites determine how much of their own patients' information is made available to other WHIN sites. For example, an ambulance company may subscribe to WHIN to get demographic data from member hospitals just to make sure it gets names and addresses right on its bills; the company would sign up for demographic data, as authorized by the WHIN member hospitals, and would not be granted access to clinical or financial records.

Even with those safeguards, patients still may worry about the privacy of their medical records. But Diana J.P. McKenzie, a partner with Gordon & Glickson PC, a Chicago law firm that specializes in IT issues, says most electronic records are far more secure than paper records, which generally are accessible to anyone who can open a file cabinet. "In reality," she says, "I don't think people realize how easy their medical records are to access *without* a network."

—T. Field

**"THINK ABOUT IT LOGICALLY.
THESE PEOPLE COMPETE FOR
PATIENTS DAILY—
THEY'RE GOING TO SHARE?"**

—Del Richmond

pendent health networks might link together and create a true national health information infrastructure.

"This is not a technical challenge," says Wei-Tih Cheng, vice president of information systems at Memorial Sloan-Kettering Cancer Center in New York and foundation board chair of the College of Healthcare Information Management Executives. "The question is whether organizations are ready for information sharing."

Keeping Its CHIN Up

*Wisconsin Health
Information Network*

In contrast to the many CHIN efforts that have stalled nationwide, Wisconsin Health Information Network (WHIN) is the CHIN that worked.

Based in Brookfield, Wis., the for-profit corporation was created five years ago in response to the same trends that spawned other CHIN ventures—the evolution of IT and the growing desire of health-care agencies to cut costs and streamline data flow. But in contrast to the CHINs that died aborning, WHIN has grown from a network of 500 physi-



**THERE'S NO
BACKUP?**

ENCORE DATASHARE.™ THE ENTERPRISE BACKUP SOLUTION.

You know how valuable your corporate information is. Are you protecting all of it?

In the past, your biggest worry was backing up the mainframe. But now, your corporate information is on a multitude of platforms. It's on mainframes, it's on open systems, it's on network servers, it's even on desktops. And you're faced with the challenge of protecting it. All of it.

You're not worried about your mainframe data, it's always secure, protected by proven, reliable backup utilities and disciplines. But your open systems and network servers don't share the same security. What if they could?

With Encore's Infinity SP™ Universal Storage Processor and DataShare™, they can. The Infinity SP provides

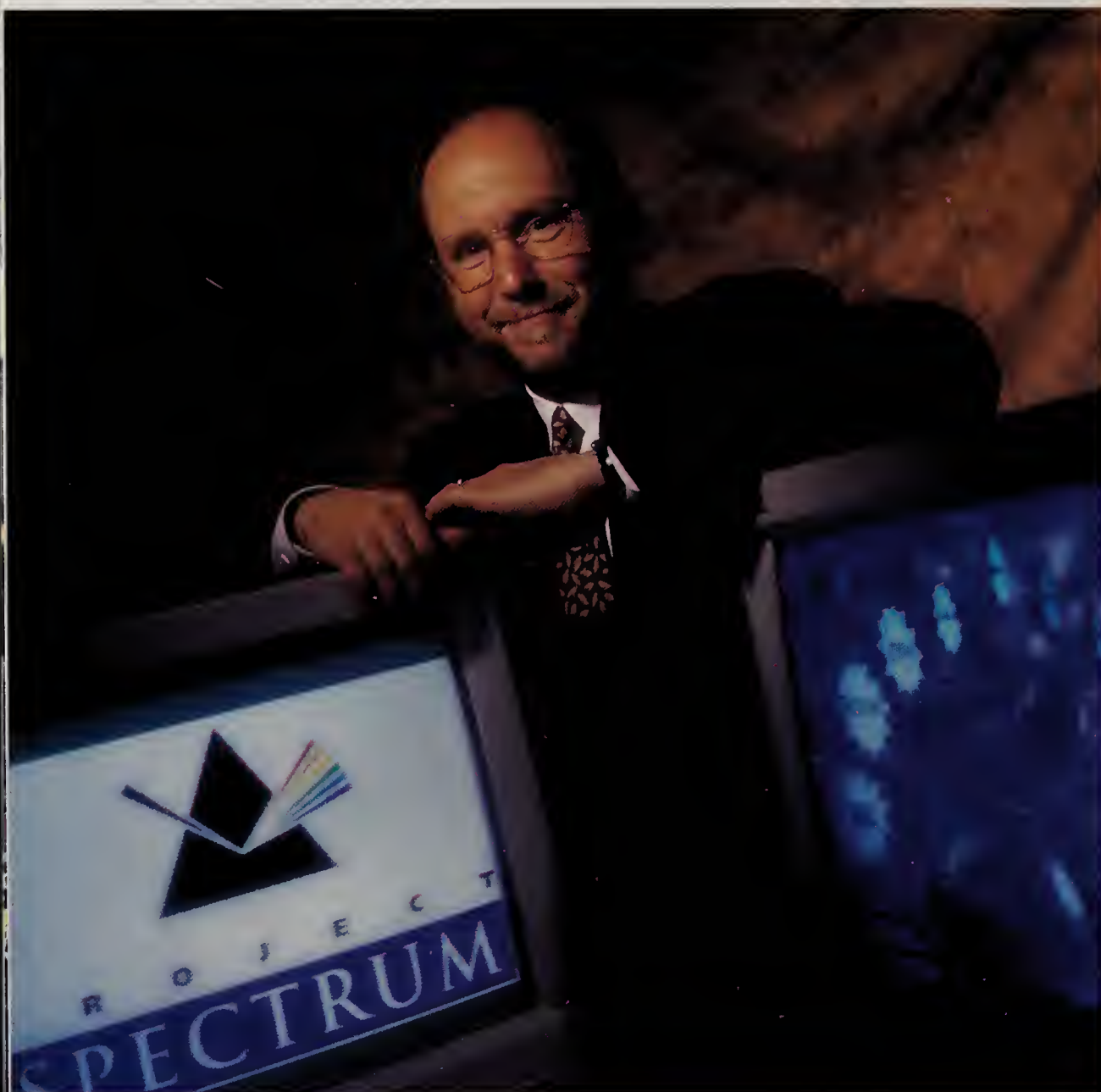
centralized storage for your information. And DataShare facilitates mainframe-based backups of all of your data — mainframe, open systems, and network servers. All of your corporate information can now be safeguarded against disaster using established, robust mainframe tools and procedures — tools and procedures you've always relied on. All of your information. The information you can't afford to lose.

Protect all of your corporate data.

Call Encore at 1-800-933-6267.



DataShare™
Data On Demand



DAVID WEISS: *Project Spectrum uses Internet technology to link all of BJC's hospital information systems and give physicians instant access to medical records, radiological images and Internet resources. The system also lets doctors consult via videoconferencing.*

cian participants in its first year to one that in 1996 provided information services to more than 3,000 subscribers in a customer base of hospitals, physicians, payers, ambulance companies and other health-care agencies.

To what do WHIN's executives attribute the endeavor's success? "Timing, for one thing," says Michael C. Jordan, WHIN's president and general manager. WHIN was created nearly a year before President Clinton's call for health-care reform, so it was well ahead of the national CHIN movement. Participants were enthusiastic about being in on an innovative project.

Second, WHIN delivers. By offering 24-hour dial-up access to four basic information products—e-mail, clinical data flow, payer transactions and online clinical reference systems—WHIN helps subscribers save money. A 1995 work-

flow study by two business professors at the University of Wisconsin at Milwaukee found that hospitals save \$5 every time they respond to physicians' information requests using WHIN rather than via phone, fax or mail, and physicians save \$2.62 each time they submit requests to hospitals via WHIN. Based on average transaction volumes, the study authors estimate that physician practices can save as much as \$68,000 annually through WHIN, and hospitals can save up to \$1.1 million.

It also helps that WHIN is a joint venture of Ameritech Corp., a regional telecommunications company, and Aurora Health Care, a Wisconsin-based IDS. WHIN benefits from deep corporate pockets and a steady stream of income from subscribers, who pay a one-time software development charge (\$50,000 to \$120,000, depending on the

complexity of the installation) and a monthly subscription fee (\$30 per physician at member hospitals). Although he won't reveal details of WHIN's financial health, Jordan says, "we are meeting or exceeding our expectations."

Another reason for WHIN's success is the simplicity—and security—of its infor-

**A STUDY FOUND THAT
PHYSICIAN PRACTICES
CAN SAVE AS MUCH AS
\$68,000 ANNUALLY
THROUGH WHIN,
AND HOSPITALS CAN SAVE
UP TO \$1.1 MILLION.**

mation-sharing software. Developed by Health Network Ventures, another Ameritech/Aurora collaboration, the application's Windows-based user interface can be installed atop any existing legacy system. Although the system is easy to use, its encrypted data is accessible only to authorized users.

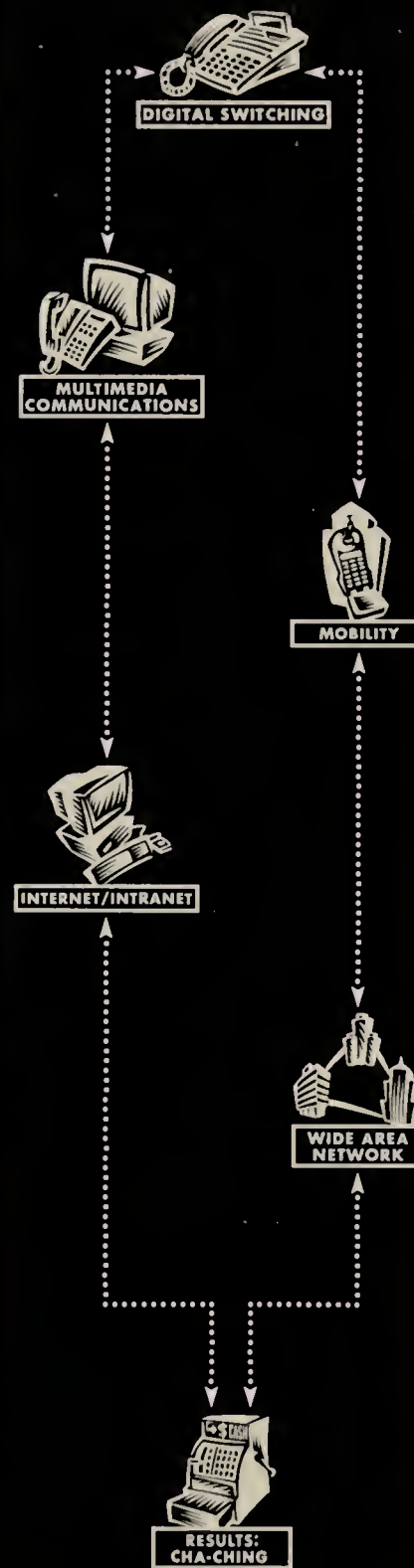
But WHIN can't be considered a border-to-border victory yet. "From a functional standpoint, we've proven the concept," Jordan says, "but from a penetration standpoint—with only 1,200 of the state's 9,500 physicians using WHIN—we have not yet succeeded."

WHIN suffers from the chicken-and-egg syndrome: Physicians won't sign up until they know their affiliated hospitals are online, but hospitals don't want to subscribe until they know the physicians are there. Meanwhile, insurance companies won't sign on until they see a high volume of users. That resistance has forced WHIN to pursue a more aggressive marketing campaign than expected, Jordan says, and network growth is about 18 months behind original projections. Still, Jordan expects 38 percent overall growth for WHIN in 1997, with a 50 percent increase in transactions.

And although nationally CHINs are out and IDSs are in, WHIN remains committed to its long-term goal: to connect all of Wisconsin's health-care entities with a single information network. "The plan we set out with five years ago and the trends we saw are all continuing," Jordan says. "I really sincerely believe [success] is just a matter of time."

Is your business running at the
speed of Indy? It can be.

**NORTEL
INTRODUCES
POWER
NETWORKS**



INTRODUCING POWER NETWORKS. Today, at the Indianapolis Motor Speedway, there's something moving faster, more reliably and more efficiently than ever before: their new digital communications and computer network. A Power Network. Designed by Nortel.

Customized to Indy's specific needs, the Power Network integrates and enhances all of the Motor Speedway's existing communications networks. So every aspect of their business operations – from their telephone system to global Web access on the Internet to their call center – works faster, more reliably and more cost-efficiently.

All of which allows them to truly deliver for their customers. From the drivers and teams to the fans, both at the race and around the world. And a Power Network can do the same for you. Just give us a call or head for our Web site and find out if your business is moving as fast as it can be.

NORTEL
NORTHERN TELECOM

Do you have a Power Network? Visit our Web site at www.nortel.com/powernetworks14 or call 1-800-4NORTEL, department 14.

©1997 Northern Telecom. Power Networks, Nortel and the Nortel globemark are trademarks of Northern Telecom. Indy is a registered trademark of IMS Corp. Used with permission.

Showing the "Show-Me" State

BJC Health System

From a multitude of mergers, St. Louis-based BJC Health System has emerged to become not just a showcase IDS, but a prime example of how dissimilar information systems and the IS professionals who manage them can be brought together to serve a greater good.

Born in the early 1990s with the mergers of Barnes and Jewish hospitals and Christian Health Services, BJC has become the country's second-largest nonprofit health-care system. Today, it encompasses more than 100 inpatient and ambulatory sites throughout Missouri and southern Illinois, including 13 hospitals, six nursing homes and dozens of community-based health-care service providers.

To connect the entities within the IDS, David A. Weiss, BJC's vice president of information services, faced a dilemma common to any CIO caught in the middle of a merger: "How do you take several hundred disparate systems and bring them together in a way that [lets] BJC put a common foot forward to its customers?"

The short-term answer was to bring the various IS staffs under one umbrella. Because people were loyal to their own traditions, the task was harder than Weiss expected. "A lot of 'me' issues crop up every day," says Weiss, who adds that he countered them with "a lot of talking, a lot of planning. I try to show people the business rationale for what we're doing and why—that it's not a 'Hospital A' or 'Hospital B' issue; it's a BJC issue."

Some early wins helped solidify the IS team. By combining the data centers right away, the group saved BJC nearly \$3 million over three years. Also, by building a bridge network over the existing telephone, voice mail and e-mail systems, Weiss's team established initial connectivity among the BJC facilities.

But to make BJC a truly robust IDS organization, the IS group had to link all of the organization's clinical and financial information systems. Without replacing these systems, which would have

been a monumental and expensive task, BJC sought vendors' help to build a new network on these platforms. After months of study, BJC in 1994 announced its solution: Project Spectrum.

A multimillion-dollar integrated medical information system and high-speed digital telecommunications network, Project Spectrum was launched in 1996. It uses Internet technology to link all of BJC's hospital information systems and give physicians instant access—from their offices, hospitals or remote sites—to radiological images, medical records and Internet resources. The system even allows videoconferencing between physicians, who can consult with each other while simultaneously viewing patient information.

Spectrum was developed and tested by BJC in partnership with the Washington University School of Medicine in St. Louis, IBM, Kodak and Southwestern Bell. Today, Spectrum links medical information from four BJC hospitals, with plans this year to connect several additional hospitals, home health

services and physicians' offices.

So far, Spectrum has worked as advertised, Weiss says, but the system has not been without its challenges. For example, Weiss's team originally planned to design a traditional network but decided midway through the project to embrace Internet technology instead. As a conse-

"A LOT OF 'ME' ISSUES CROP UP EVERY DAY. I TRY TO SHOW PEOPLE THE BUSINESS RATIONALE FOR WHAT WE'RE DOING AND WHY— THAT IT'S NOT A 'HOSPITAL A' OR 'HOSPITAL B' ISSUE; IT'S A BJC ISSUE."

—David Weiss

quence, the development team had to rework the client/server architecture from "fat" client to "thin," and linking the various legacy systems has been an ongoing struggle. The result, however, is a system that is easier for users to access and for IS to maintain.

Weiss envisions a future in which BJC might eliminate film and let doctors review all X-rays online. Already the organization is talking about creating centers of expertise such as a central radiology facility that would serve the entire BJC system.

Four years into the IDS relationship, Weiss says that BJC's combined IS staff has responded well to the IDS challenge. "IT here has become very quick at bringing groups and systems together," he says. "[The challenge] certainly keeps me off the streets at night."

The Best of Both Worlds

Columbia/HCA

Columbia/HCA Healthcare Corp. wants the best of both worlds: to be a little bit CHIN, a little bit IDS.

As the nation's largest health-care services provider, Nashville, Tenn.-based

Lessons Learned

Advice for connecting disparate information systems

Health-care organizations that have successfully linked independent facilities within their information infrastructure have:

- Created a common patient identifier
- Installed standard systems or processes
- Protected the security of private medical and business data.

Organizations that have failed to link independent agencies have not:

- Mandated system or data standards
- Spread the investment fairly among members
- Convinced patients or partners that their private or strategic data will be protected.

—T. Field

STILL DEPENDING ON PASSWORDS AND FIREWALLS TO SECURE YOUR INTERNET-BASED NETWORK?



Espionage, sabotage, destruction, subversion, conspiracy, larceny—the latest Hollywood epic? No. Just another day in the life of your internet/intranet-based network.

If your business uses networks as the backbone for secure data exchange and transactions, standard encryption and firewall technologies can provide some measure of protection from outside attacks and theft by competitors, hackers or mercenaries. But what about the internal threat—your own employees armed with computer access and passwords? In fact, a recent *Information Week/Ernst & Young* survey found that over 40% of companies polled had suffered financial losses from malicious acts by employees, while losses resulting from outside sabotage and industrial espionage were reported by just over 30% of respondents*.

Now, however, there is a decisive defense against internal or external assaults on your company's network security. **SignaSURE ESS™** (Enterprise Security Suite) from Datakey, is the first public key encryption system that eliminates the gaps in internet/intranet security by creating a seamless, end-to-end solution—providing secure access, private data exchange, authentication with digital signatures, data integrity and transaction non-repudiation.

SignaSURE ESS uses advanced public key encryption software—with one “key” difference. A personal cryptographic token—such as a smart card or smart key—offloads sensitive security and encryption functions onto the token, which separates these functions from the system which is being protected.

Simply put, the sophisticated combination of hardware and software technology found in **SignaSURE ESS** is the only way to assure a completely secure public network environment. Moreover, **SignaSURE ESS** is often more affordable than software-only solutions, and is fully Windows 3.X, 95 and NT compliant.

Close the gaps in network security. For information and a free **SignaSURE ESS** demo diskette, call today toll-free at 1-888-DATAKEY (1-888-328-3539), or visit our web site at <http://www.datakey.com>

* Source: 1996 Information Week/Ernst & Young Information Security Survey

Datakey®

DATAKEY ▼ 407 WEST TRAVELERS TRAIL, BURNSVILLE, MN 55337 ▼ 1-888-328-3539 PH: 612.890.6850 FAX: 612.890.2726

SPECIAL REPORT ON HEALTH CARE: INFORMATION INFRASTRUCTURE

Columbia/HCA owns and operates 342 hospitals, 147 outpatient surgery centers and more than 550 home health-care providers in 37 states, England and Switzerland. Yet rather than create a nationwide IDS network for its ever-growing array of U.S. facilities, Columbia concentrates on building community-based information systems—essentially, CHINs—within each of its local markets. Richard E. Chapman, senior vice president of information systems, says the approach matches Columbia's greater corporate strategy of maximizing local resources.

"If we're in an area, we either are a significant player or we plan to be," Chapman says. So as Columbia acquires existing health-care facilities to provide comprehensive medical services within a market, Chapman's team steps in to connect those formerly independent agencies.

In contrast to BJC Health System, which modifies members' legacy systems to work within its greater network, Columbia pulls existing systems from its new facilities, replacing them with a customized Columbia Patient Care System that uses technology developed by Medical Information Technology Inc. (Meditech), a Westwood, Mass.-based vendor of IT for the health-care industry. The client/server, TCP/IP-based system includes a patient index, which stores demographic and insurance information that patients now only need to give once, and a patient care inquiry module, which gives physicians access to clinical data.

"It's a huge investment," Chapman says of the cost to replace systems with the Columbia solution, "but we figure it's 'pay me now or pay me later.'" The payback comes in reduced costs and increased productivity—figures that stand out dramatically in facilities where Columbia's system is installed. And once trained on the system, employees can transfer easily between Columbia facilities. Though he won't divulge specific cost savings, Chapman says he's seen "a significant improvement in places where we've rolled [the system] out."

Because Columbia has focused its resources on developing those community-based networks—and that job is hardly finished—it has not yet linked its individual systems to form a national IDS network. Patients, however, can move



RICHARD CHAPMAN: Columbia pulls existing systems from its new facilities, replacing them with a customized patient care system. Eventually, Columbia plans to link its community-based networks to form a nationwide IDS network.

between markets and be assured that, if the standard system is installed, Columbia health-care providers have dial-up access to data in the patients' home networks. Later this year, Columbia will give patients who travel bar-coded VIP cards that will indicate how to access their private medical records—a feature particularly attractive to the nation's senior "snowbird" population.

Columbia began establishing its network in 1994, soon after acquiring a hospital that was using a standard Meditech health-care information system. Customizing the Meditech approach to meet its own needs over a midrange platform, Columbia embarked upon an aggressive rollout of the system, conducting 300 major conversions in 1996 alone. By 1998, Chapman says he expects his IS group will have completed its backlog of system conversions and will be able to keep pace with Columbia's acquisitions (about 50 hospitals in 1995 and more than 20 in 1996).

Within the Columbia markets, it is a challenge to get formerly independent—and in some cases, formerly competing—entities to suddenly share information, and it can be a struggle to convince health-care professionals to abandon their own systems. But when faced with this resistance, Chapman says, "we go out and sell the strategy."

Beyond connectivity and faster information flow, Chapman shows new users how they will be a part of what he calls the largest decision-support database in the health-care industry. The system allows Columbia professionals to generate enterprisewide quality reports to measure Columbia facility outcomes against government standards and other health-care facilities.

"Once you understand the strategy," Chapman says, "it's pretty easy to buy into it." **CIO**

Staff Writer Tom Field can be reached at tfield@cio.com.

SOME **storage management** COMPANIES
WILL DO ANYTHING TO *predict* THE FUTURE.
WE'RE DOING EVERYTHING TO *create* IT.

If you want to know what the future holds in storage management, don't consult a fortune-teller. Consult a visionary.

At Symbios Logic, we've quietly been shaping the future of storage management for nearly 20 years now. And we have more than 500 patents worldwide to show for it.

Our storage management expertise spans from integrated circuits to boards to software to complete RAID storage systems. In fact, we invented the first SCSI protocol chip (which is now in the Smithsonian Institution), the first OEM RAID chipset, and the first RAID Fibre Channel storage system. We're the world leader in SCSI devices sold and third in OEM RAID storage systems.

We also sit on the industry committees that guide the development of storage standards, including SCSI, RAID, Fibre Channel and I₂O. When the future of storage management is at stake, we have something to say about it.

Call 1-800-856-3093 for company and product information, or visit www.symbios.com/cio.htm. When you're searching for storage management leadership, look closely at Symbios Logic. Very closely.



SYMBIOS
L O G I C

The Storage Connection™

transaction no. 00389254911

LOGGED SECURED AUTHORIZED BILLED

AT 9:00 AM ON JANUARY 17, 1991, OIL LISTED AT \$32.00 PER BARREL. AT 9:01 AM, IT LISTED

AT \$21.44 PER BARREL.

THAT 60 SECONDS IS ALL YOU NEED TO KNOW ABOUT US.

Every second counts. And every second of every day, Tandem® systems are trusted to handle 90% of the world's stock transactions, 80% of all ATM transactions, 66% of all credit card validations, and two-thirds of all 911 calls in the United States. Tandem now brings this reputation in business-critical online transaction processing to a wider range of open, scalable platforms: from our high-performance S-series NonStop® Himalaya® and UNIX® system-based servers to Windows NT® Server-based solutions. Because whether you're trading oil or filling orders, every second counts. Contact us at www.tandem.com for more information. Or to receive our latest information pack, which includes the new Windows NT Enterprise Management Sampler CD, call 1-800-NONSTOP, extension 8000. Every second, every transaction, every customer counts.



EC

Reader ROI

CAN ORGANIZATIONS USE electronic commerce to make their supply chains more efficient and strengthen ties among business partners? Three companies show you how to use the Internet to improve your company's supply chain processes by reducing cycle times, improving order fulfillment accuracy and inventory management, and providing better customer service.



ILLUSTRATION BY TED PITTS

Riders

How can you streamline your supply chain to include business partners? The answer lies in electronic commerce: Just use your Web.

BY PETER FABRIS



HOW MANY COMPANIES DOES IT TAKE TO MAKE A light bulb? Just one, if all parts and equipment are readily available and operate perfectly all the time. Of course, that's the stuff dreams are made of, and it has no place in our mortal world. Rather, the right answer is that it takes a multitude of companies to manufacture and distribute just about any product: suppliers of parts, servicers of equipment, the manufacturer and distributors, to name just a few.

General Electric's Lighting division is no stranger to the partnerships that lead to successful manufacturing. Production lines in the Cleveland-based light-bulb manufacturer's 26 assembly plants run 24 hours a day as machines such as those that shape glass and stamp metal crank out hundreds of different light bulb models. If a single part in any one of those machines fails, it can mean lights out for the entire



GE Lighting
Cleveland

**Ronald Stettler, manager
of global sourcing systems**

Business: Manufactures light bulbs

Strategy: Linked legacy ordering systems with Trading Partners Network to let suppliers bid on machine parts orders

Systems: IBM mainframe ordering system; Trading Partners Network, an extranet developed by General Electric Information Services

www.ge.com/lighting/

assembly line. The company used to deal with the problem the old way, placing special rush orders with machine-tool suppliers when part failures shut down production. But today, GE Lighting is viewing the problem in a whole new light: It is using the Internet to create close alliances with its business partners and thereby keep its operations from burning out.

For many industries, tight supply chain integration with other businesses is no longer a competitive advantage—it's a competitive imperative. "It used to be Company X competing with Company Y," says Jon Kirkegaard, vice president of logistics operations for i2 Technologies Inc., an Irving, Texas, supply chain software developer, who is a former Booz, Allen & Hamilton supply chain IT consultant. "Now it's supply chains competing with supply chains."

Today, electronic commerce can be the means to end-to-end supply chain management. Using the Internet as a universal networking standard, business partners can create seamless, automated supply chain systems that function as smoothly as if the

organizations operated as one entity. That creates faster order processing, improved inventory tracking and management, more accurate order fulfillment, support for just-in-time manufacturing and improved customer service.

At GE Lighting, for instance, electronic commerce was the key to creating a streamlined procurement system that is integrated with the firm's 55 machine parts suppliers. Until recently, the requisitioning process from the plants was initiated electronically via the existing purchasing system. The purchasing agents would review daily requests and initiate the price-quoting process. The engineering drawings of the part and an electronic quote form were requested, and the packages were prepared. Simply fulfilling a request for quotation could take several days, and the division typically issued 100 to 150 such requests a week. The company then mailed the completed requests to suppliers. "Some people in the machine parts unit were basically just stuffing envelopes all day," says Ronald Stettler, manager of global sourcing systems. In all, GE Lighting's procurement process could take as long as 22 days.

Today, however, GE Lighting is transforming that kludgy, antiquated process into a streamlined one that takes about eight days. How? It started using the Trading Partners Network (TPN), an extranet developed by sister division GE Informa-



Core Competencies and Competitive Advantage:

October 12-15, 1997
Ritz-Carlton
Naples, Florida

Think Internally, Act Externally



Moderator

Dr. Jim Wetherbe

Also Featuring

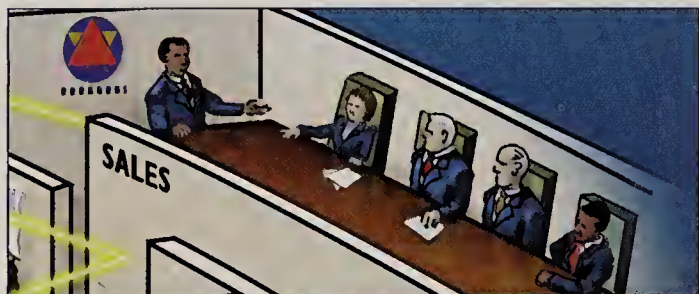
F. Warren McFarlan
Harvard Business School

Peter Bergman
John Cross
James Donehey
Christopher Hoenig

Loretta LaRoche
Abbie Lundberg
Paul Saffo

Keynote Presenter

Core Competencies and Competitive Advantage:



In the past, corporations have associated big business gains with internal reengineering designed to promote increased efficiency. Not so in today's global marketplace. Corporations now realize that returns are maximized when IS aligns its strategy with the organization's external business goals and puts its muscle and ingenuity behind the core competencies the company is leveraging to compete and prosper.

The latest in the *CIO Perspectives*SM conference series,
Core Competencies and Competitive Advantage:

Think Internally, Act Externally, will explore how IS has become the key to fully exploiting an organization's strengths in pursuit of competitive advantage.

Join keynote presenter and business management theory expert **F. Warren McFarlan**, senior associate dean, director of external relations and Albert H. Gordon professor of business administration, *Harvard Business School*. Our moderator will once again be **Jim Wetherbe**, director, MIS Research Center, *University of Minnesota*, Federal Express Professor of Excellence and director, Center for Cycle Time Research, *University of Memphis*.

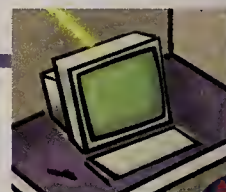
Other featured presenters include **Paul Saffo**, director, *Institute for the Future*; **Peter Bergman**, who will humorously discuss *1000 Ways to Survive the Millennium: Live from WY2K*; **Loretta LaRoche**, who will offer her own special insight on reducing stress in the workplace; and **John Cross**, head of information technology, BP Group, *The British Petroleum Company PLC*.

To participate in **Core Competencies and Competitive Advantage: Think Internally, Act Externally**, visit our Web site at www.cio.com and enroll online or simply complete the enrollment form on the back of this brochure and fax it to us at 508 879-7720. You may also call our conference hotline at 800 366-0246.

Join your colleagues and peers at this important event as we learn how to deliver newer, bigger and better business returns.

"In a world where conferences continue to compete for CIO mind share and time, the CIO conference continues to stand out from the herd."

Howard O. Halpin III
Assistant Vice President
Information Technology
Newbridge Networks, Inc.



CORPORATE HOSTS

To enroll call 800 366-0246 or

ACXIOM

CABLETRON
systems
The Complete Networking Solution™

CENTURA
SOFTWARE CORPORATION
formerly known as GUPTA

CISCO
SYSTEMS

Data General

IBM

INFORMIX

intel

LBMS

LOCKHEED MARTIN

Think Internally, Act Externally



Jim Wetherbe
Moderator
Director
MIS Research Center
University of Minnesota
Federal Express Professor
of Excellence
Director
Center for Cycle
Time Research
University of Memphis



Christopher Hoenig
Director
Information
Management and
Technology
*US General
Accounting Office*



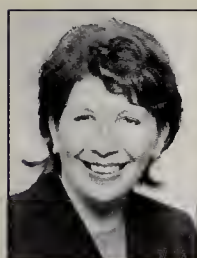
Keynote Presentation:

At the Intersection: IT and Corporate Strategy

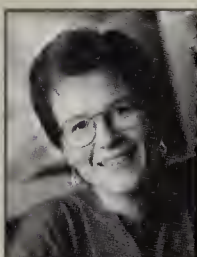
F. Warren McFarlan
Senior Associate Dean
Director of External Relations
Albert H. Gordon Professor
of Business Administration
Harvard Business School



Peter Bergman
Co-Founder
Firesign Theater
President
Bergman Stallone, Inc.



Loretta LaRoche
Founder
The Humor Potential



Abbie Lundberg
Editor in Chief
CIO Magazine



James Donehey
CIO and
Senior Vice President
Capital One Services, Inc.

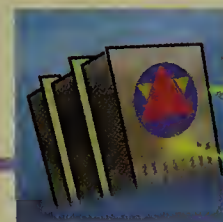
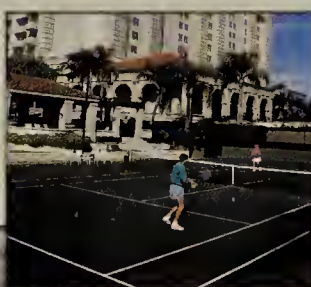


Paul Saffo
Director
Institute for the Future

The late 1900's have shown an unprecedented intersection and intertwining of information technology and corporate strategy. Organizations must deal with IT's impact on the nature and quality of its products and services, while redefining its channels of distribution and methods of promotion. The reward for successful adaptation is growth, while the penalty for failure is swift extinction. In this new world the CIO is indispensable to managers in choosing intelligently among alternative strategies and installing the disciplines necessary to translate the chosen course into concrete actions and systems.



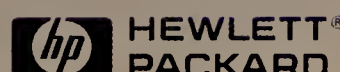
*Ritz-Carlton
Naples, Florida*



*"The CIO conference
provides the environment
to focus on strategy with
peers who are addressing
the same critical issues."*

J.L. Puckett
CIO
BBN Corp.

visit our Web site at www.cio.com



ENROLLMENT FORM



Core Competencies and Competitive Advantage: Think Internally, Act Externally

October 12-15, 1997 • Ritz-Carlton • Naples, Florida

Please visit our **Web site** at www.cio.com or **Fax** to 508 879-7720. You can also **Call** us at 800 366-0246 or **Mail** completed form to: Executive Programs, CIO Communications, Inc., 492 Old Connecticut Path, Framingham, MA 01701.

NAME

TITLE

COMPANY

ADDRESS

MAIL STOP

CITY

STATE

ZIP CODE

PHONE

FAX

E-MAIL

COMPANY WEB SITE ADDRESS

WHAT IS YOUR INDUSTRY?

YOUR NAME AS YOU WANT IT TO APPEAR ON YOUR BADGE

HOTEL ARRIVAL DATE

HOTEL DEPARTURE DATE

NAME OF COMPANION (IF PARTICIPATING IN COMPANION PROGRAM)

TIJ2

CHECK ALL THAT APPLY

ENROLLMENT FEES:

☐ **IS Practitioners/Executives**

If you are a CIO, IS executive or hold another executive position, the fee is **\$1,695**.

☐ **Government/Military**

The fee, which includes your hotel for **three nights**, is **\$2,110**. Do not make your own hotel reservations; CIO will make them for you.

☐ **Sales/Marketing/Consulting**

If you hold a sales, marketing, new business development or consulting position, the enrollment fee is **\$5,000**. This includes executive management of consulting companies. This fee is payable by **company check only**. CIO will make the final determination of this category.

☐ Check here if this is your first CIO Perspectives conference.

OTHER ACTIVITIES:

☐ **COMPANION PROGRAM: (\$275)**

Companions must be enrolled in this program to attend any conference-related functions. Includes all scheduled meals, receptions, entertainment, companion breakfast, a stretch and tone class, and a tour of **The Conservatory**, with an exhibit hall showing the ecological balance of nature in Florida, a shell collection, animal rehabilitation clinic and an aviary housing American Bald Eagles. Conference session attendance is **not** included.

☐ **Golf Tournament:**

Yes, I'd like to participate in the golf tournament on Sunday, October 12 at 11 a.m.

Hosted by Lockheed Martin Corporation

☐ **I will not be staying at the Ritz-Carlton.**

Name of alternate hotel

PAYMENT INFORMATION: (Please make checks payable to CIO Communications, Inc.)

☐ Check enclosed ☐ Bill company (A purchase order # must be submitted)

☐ P.O. # _____

☐ Credit card # _____

☐ AMEX ☐ VISA ☐ MC Exp. _____

Signature: _____

Business
Card
REQUIRED
In Order To
Process
Registration

ATTIRE

Casual! Please, no suits, ties or business attire!



HOTEL ACCOMMODATIONS

A block of rooms has been reserved at the Ritz-Carlton. We urge you to make your reservations early by calling the hotel at 941 598-3300. Be sure to identify yourself as part of the **CIO** conference to receive the conference rate. Make your reservations early and guarantee your room with a credit card, as all unreserved or unguaranteed rooms will be released on September 12, 1997. Hotel reservations, cancellations and charges are your responsibility. **CIO** will make hotel reservations for government/military participants only.

TRANSPORTATION

American Airlines is the official conference carrier. For discounted airfare, call 800 433-1790 and reference Star File #S0307MA. AVIS is the official car rental provider. Call AVIS at 800 331-1600 and reference B766657.

ENROLLMENT FEES

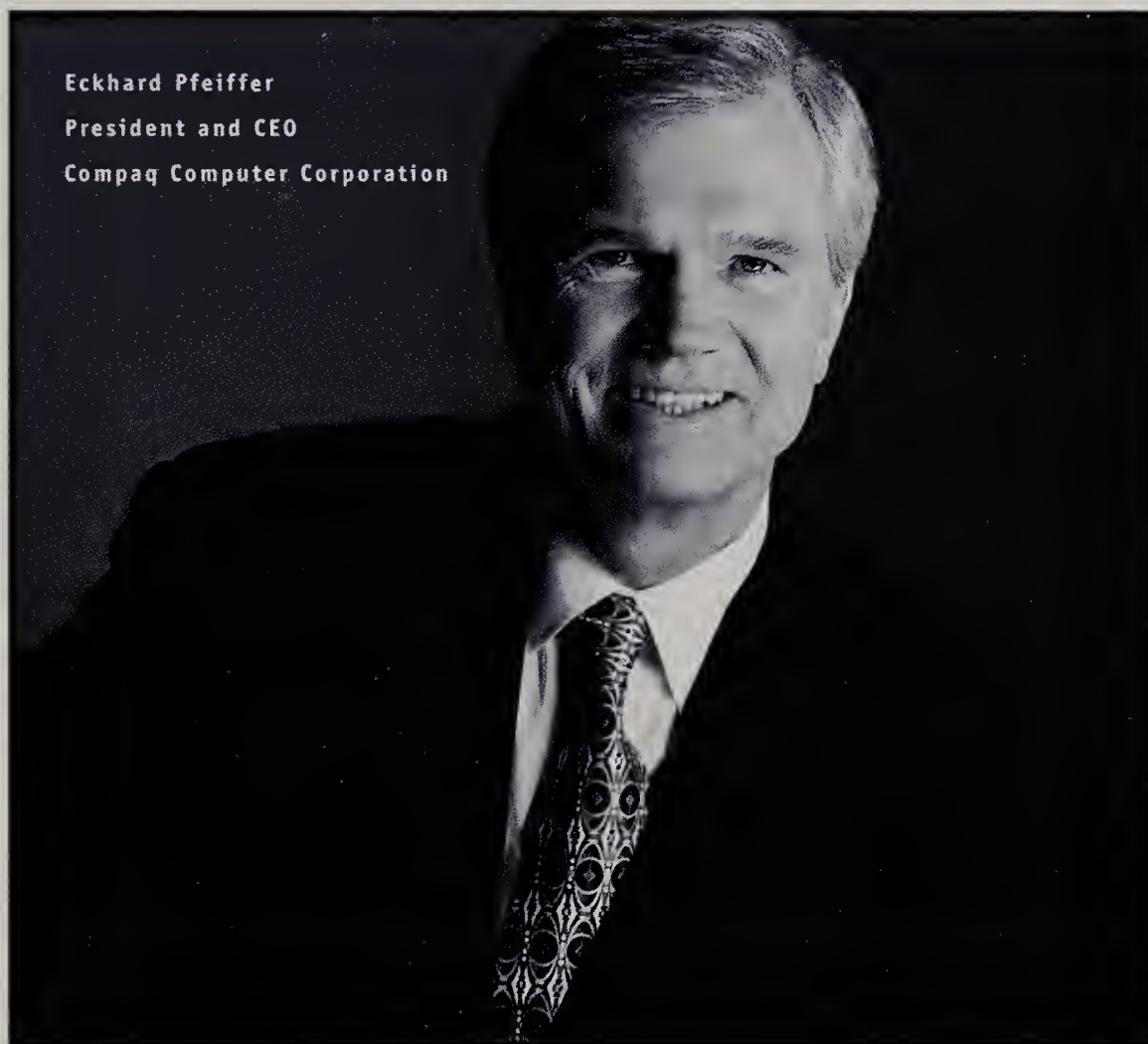
All enrollment fees must be paid in advance of the meeting. Fee includes conference sessions, concurrent sessions, corporate host displays, conference materials and scheduled meals, receptions and entertainment. Transportation, hotel and recreation are your responsibility. Please note that submission of this enrollment form to CIO obligates the attendee/sender for the enrollment fee.

CANCELLATION

You may cancel your enrollment up to September 12, 1997 without penalty. A \$250 administration fee will be imposed for cancellations between September 13-26. No refund or credit will be given for cancellations received after September 26, 1997 or for no shows. You may send a substitute in your place. CIO reserves the right to decline enrollment to any registrant.

TO ENROLL CALL 800 366-0246, visit our WEB SITE at www.cio.com or FAX us at 508 879-7720.

WORLD-CLASS LEADERS DELIVER WORLD-CLASS SOLUTIONS



Eckhard Pfeiffer
President and CEO
Compaq Computer Corporation

"Now with **SIEBEL, COMPAQ** enables highly optimized, ENTERPRISE-CLASS SALES INFORMATION SOLUTIONS TO DRAMATICALLY INCREASE PRODUCTIVITY AND PROFITABILITY."

COMPAQ

Compaq™—the worldwide leader in industry-standard enterprise computing platforms. Siebel®—the

worldwide leader in global sales information software solutions. Together, Compaq and Siebel size, test,

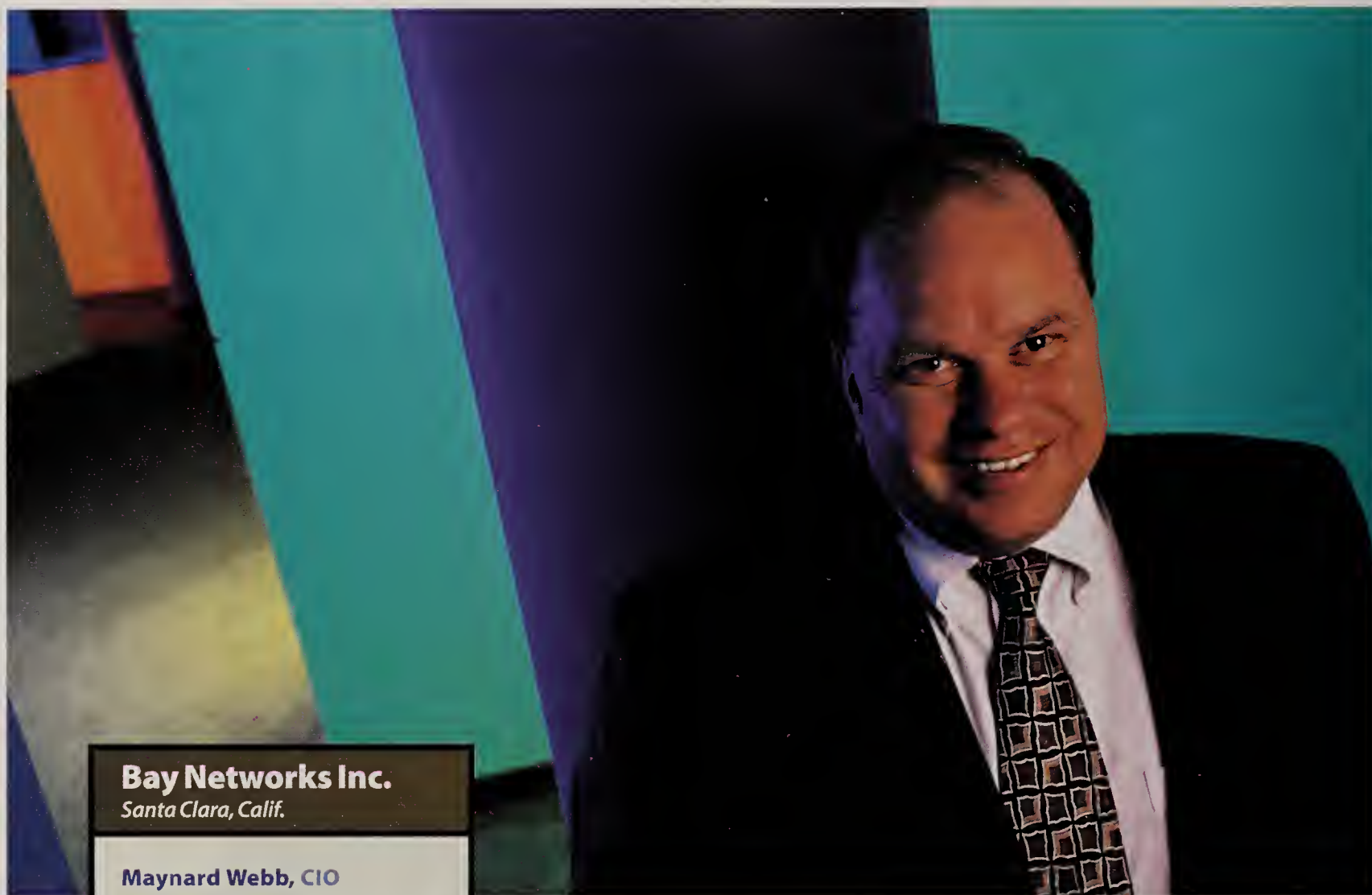
and optimize proven sales information solutions for their global customers. The result—dramatic and rapid increases in

sales productivity, profitability, and customer satisfaction. Join the many world-class, industry-leading organizations,

such as Compaq, who have standardized on Siebel and provide your company with a proven competitive advantage.

To learn more, call us at 1-800-720-3115, ext. 2321 or visit Siebel at www.siebel.com.

SIEBEL
Sales Information Systems



Bay Networks Inc.
Santa Clara, Calif.

Maynard Webb, CIO

Business: Manufactures networking devices

Strategy: Built extranet to link ordering and inventory systems with distributors and suppliers

Systems: Netscape Commerce Server, Checkpoint Firewall-1, proprietary security system including password provision
www.baynetworks.com

tion Services (GEIS), a Rockville, Md.-based provider of electronic commerce services. By integrating TPN into its legacy procurement system, GE Lighting gained the ability to let suppliers view the requests on the extranet shortly after buyers in the worldwide sourcing division post them. Suppliers can then post blind bids using TPN.

Here's how it works: Plant personnel request parts using an IBM mainframe ordering system. Once a day, those requisitions are extracted in a batch process that automatically matches them with the corresponding drawings stored on an optical jukebox. A Unix system interfaces with the mainframe and the jukebox to match TIFF drawings with codes for the parts, and Autoload, a Windows-based desktop tool, automatically posts the request on the network. Suppliers enter bids on TPN forms from their Netscape browsers, usually within seven days of the request's posting.

For several years before the advent of TPN, GE Lighting could receive bids from suppliers on the GEIS network. Because TPN is an Internet solution, now suppliers need only have a Web browser, which opens up the process to new suppliers. For example,

GE Lighting recently received a bid from a Hungarian company that underbid the competition by 20 percent; in years past, the Hungarian company wouldn't have had access to GE's order and therefore wouldn't have had the opportunity to make a bid.

GE Lighting's project to integrate procurement systems with TPN took six IS people about three months to complete. Though IS had to do some C coding, the most challenging part of the project was coordinating the new process because so many people—buyers, engineers and suppliers—needed to give their input, Stettler says. Working with suppliers to make sure they were comfortable with the TPN interface prototype was a key success factor, he says. GE Lighting had close relationships with suppliers before, but with the network, those alliances have become even stronger. For example, it is not unheard of for the GEIS technicians to drive through snowstorms to reload Windows on a supplier's TPN PC just to get the supplier back online so it can make bids.

By using TPN, several General Electric divisions, including GE Lighting, have, on average, cut procurement cycles in half, reduced procurement processing costs by 30 percent and induced suppliers to reduce prices due to online bidding, according to Bruce Chovnick, vice president of Internet consulting services for GEIS. Chovnick wonders why more companies haven't set up similar systems. "A lot of companies think about it for too long," he says. "The investments aren't that big." He rec-

Get the competitive edge!

YES, please enter my one-year subscription (21 issues) to CIO magazine and bill me later for only \$75, a savings of \$23 off the basic rate!

Name _____

Title _____

Company Name _____

Address _____

City _____

State _____

Zip _____

The basic one-year subscription rate for CIO magazine is \$98. This is a domestic rate only (US and Canada.) The foreign rate is \$110 prepaid in U.S. currency.



o so.
duit
mely
ajole
ause
ving
trib-
were
says.
give
Bay
tory
sys-

now
o see
ship-
lable
ship-
hurt,
ve to

INJ7

Finding Common Ground

When integrating business partners' systems, translating data protocols can make or break the project

WHEN SYSTEMS OF DIFFERENT business partners, such as order processing and inventory, are integrated so closely that they operate as one seamless system, that's supply chain integration in action. Not all companies use the same data protocols, however, and differences among business partners can make integration difficult. In such cases, success depends on a finding a standard way to translate protocols.

For instance, EDI is the reigning standard for trading partners to exchange ordering, shipment status, inventory and other crucial supply chain data. An EDI system that uses private value-added networks (VANs), however, can be prohibitively expensive. The Internet offers an inexpensive pipeline to bypass costly VANs, but companies with existing EDI-based back-office systems are not likely to trash those legacy systems. Companies that trade with non-EDI-equipped partners need some mechanism for translating EDI protocols into Internet protocols such as the secure sockets layer (SSL) encryption protocol.

A few companies are unveiling products and services to address that problem. For example, Sunnyvale-Calif.-based Actra Business Systems, a joint venture formed in 1996 between Netscape Communications Corp. and GE Information Services (GEIS), released its latest product, Ecxpert 1.0, in May. The software converts conventional EDI software protocols into Internet formats such as SSL, allowing EDI users to do busi-

ness on the Internet. GEIS also offers TradeWeb, a service that allows companies that don't have EDI software to do business with those that do. GEIS's Trading Process Network (TPN), developed as an internal system to allow GE's vendors to make bids on spare parts and electronic components contracts, has been rolled out as a public electronic commerce network. TPN's customers are primarily in the industrial manufacturing, automotive and aerospace industries.

Direct Commerce Network (DCN), a service of LittleNet LLC of Lowell, Mass., offers a number of electronic commerce services, including order processing and credit card authorization, but it may be most valuable as a bridge between business partners using different electronic commerce protocols. For instance, DCN captures product ordering information from Web commerce systems in automated Unix mail with Pretty Good Privacy (PGP) encryption and translates them into EDI messages, which are then sent to fulfillment houses. "I describe our services as service-based middleware," says Tom Little, LittleNet's president.

Like LittleNet, Unibex Inc.'s services, launched in April, spare companies the cost and labor of working out architectural and communication protocol differences with customers and suppliers. Unibex's network will be especially attractive to companies doing business globally. An athletic shoe manufacturer, for instance, could find distributors around the globe, check those distributors' Dun & Bradstreet credit ratings, negotiate a sale with one, arrange shipment with a freight forwarder, purchase shipping insurance, pay customs duties and have a bank process the distributor's payment—all over Unibex's network. The parties involved in such a transaction need only connect to Unibex via the Internet. Unibex, based in Washington, will offer incremental functional upgrades through the summer. The network should be fully rolled out by the end of the year, says Peter Sandiford, Unibex's president and CEO. —P. Fabris


Garden Escape Inc.

Austin, Texas

Cliff Sharples, president

Business: Sells plants and gardening supplies over the Web
Strategy: Built extranet to link ordering and inventory systems with suppliers

Systems: Proprietary ordering system running on Silicon Graphics hardware using the Oracle7 database engine; distributors use Pentium PCs loaded with the Eudora e-mail system
www.gardenescape.com

result, Webb says, is that customers get their orders faster. Distributors and Bay Networks benefit from that.

When you're giving outsiders access to sensitive data such as production schedules for the first time, security is a major concern, Webb says. To address that issue, Bay Networks' distributors and suppliers each have a unique account number and password that gives them access to the system, but only to the information pertaining to their own business. For example, a distributor can access the status of its own backlog orders, but not that of its competitors.

Bay Networks uses SAP's enterprise resource planning (ERP) system with an Oracle database for its supply chain transactions. In order to capture Bay Networks' ERP data, most suppliers now use their browsers to download production scheduling

believe that this will radically change the business for the better," Webb says, for themselves as well as for Bay Networks. On the other end of the supply chain, Bay Networks can see how many orders have been placed so it can step up production during peak sales periods. The

information from Partner Net into a spreadsheet program. Then they import that data into their own back-office database systems. The ideal method, says Webb, would be a direct transfer of data from Partner Net to a supplier's back-end systems. To accomplish that, Bay Networks is testing SAP's new release of the enterprise resource planning system, R/3, release 3.1, which contains Internet capability.

Not all of Bay Networks' business partners are equipped with SAP, however. Those that aren't require a mechanism for translating Bay Networks' R/3 data protocol to their own. A potential solution to that problem may come from Actra Business Systems, a joint venture formed in 1996 between Netscape Communications and GEIS. Actra sells software that converts conventional EDI software into Internet formats such as the secure sockets layer (SSL) encryption protocol, allowing EDI users to do business on the Internet (see "Finding Common Ground," Page 75). It's still very early in the game, though, and CIOs may have to find the right solution by trial and error, according to Webb. "You have to be willing to throw some stuff out," he says, "because this stuff is in its infancy and changing so fast."

Customers Join the Mix

Some companies have used the Internet for supply chain solutions that make new business models pos-

Be sure all your data makes it up stream.

NORAND

Systems @ work
in the real world™

Norand keeps your supply chain flowing smoothly.

We provide the complete system. One that goes beyond bar code scanners and hand-held terminals. It's a comprehensive system that works to add value to your enterprise. We understand how essential

data is to making the right business decisions. We anticipate the perils your data faces on the journey up, or down stream. Our on-going support and applications keep your system working, so all your data makes it where it needs to go. Norand. We are systems at work in the real world. Get your free Norand CD-ROM. Call 1-800-452-2757.

CIO 6/97



Norand Corporation
550 Second Street S.E.
Cedar Rapids, IA 52401
(319) 369-3100

<http://www.norand.com>

©1997 Norand Corporation. All rights reserved. ® and ™ are trademarks of Norand Corporation.



sible. For Garden Escape Inc., an Austin, Texas-based Web gardening supply merchant, a tightly integrated supply chain is so important to its business that it has given key business partners Pentium PCs to link to its extranet. Although the company put a lot of time into developing its Web site, the back-end systems customers never see were just as important to the company's germination. "We've done as much work on our extranet as on the Web site itself," says Cliff Sharples, the company's president and CEO, a former Coopers & Lybrand IT consultant.

Garden Escape's business plan is to be the virtual superstore and resource center of the gardening supply business. Sharples and his partners, who have consulting and software development backgrounds, devised an integrated ordering and supply chain system for an online business and then looked for an industry in which it would succeed. The entire gardening supply market, a \$50 billion industry in which

no one company has more than a 1 percent share, is very fragmented and therefore ripe for a superstore model, Sharples says. But unlike, say, a construction supply retailer, Garden Escape sells perishables—plants—that can't be stored for long in large warehouses. Therefore, a physical retail superstore model such as The Home Depot won't work easily for such gardening products.

Garden Escape made its online gardening superstore a reality by employing the Web as the point of contact with customers and the Internet to form close alliances with suppliers. Suppliers include the producers who grow the plants as well as warehouse and shippers. "We've been able to achieve a whole new organizational structure," Sharples says.

The company's extranet currently is connected with about 25 percent of its top 30 suppliers, and that number continues to grow. Garden Escape installs the Eudora e-mail system and Netscape browsers on its suppliers' PCs, which are connected via the Internet to Garden Escape's extranet. Garden Escape also adds customized inventory lists and e-mail order forms to suppliers' PCs. Suppliers use e-mail forms to update order fulfillment and inventory information. Those e-mail form messages feed into Garden Escape's electronic commerce supply chain system, which in turn automatically updates the status of individual orders and tracks supply levels.

Kristen Gilbertson, president of Capability's Books Inc., a Garden Escape supplier based in Deer Park, Wis., that publishes gardening books, appre-

ciates the convenience of the system. She needs only check off a box to indicate that a book is out of stock. "It saves a lot of time," she says. "It only takes about five minutes a day to update our inventory." Without the system, Capability's Books would have to talk with phone representatives at Garden Escape each day, a process that could take significantly longer and cost more.

Garden Escape's proprietary ordering system runs on Silicon Graphics hardware using the Oracle7 database engine. It sends order requests to suppliers in daily e-mail batches or in real-time if a customer orders his tulip bulbs or geraniums shipped overnight. In such cases the customer can get the shipment tracking number for his order from Garden Escape's Web page and click on a link

to FedEx's page to check the whereabouts of the package. In fact, a number of Internet merchants, including online book vendor Amazon.com Inc. and publisher Simon & Schuster, have added

package-tracking features with links to the FedEx, UPS and Airborne Express Web sites.

When Garden Escape is running low on a particular item, the system indicates a "low stock" status. For example, if the supply of petunias drops to 25 plants, the order entry system informs a customer who wants to order 30 that Garden Escape can only fill part of the order. If the supplier, Petunia's Emporium, has informed the inventory system that it will have more plants ready in two weeks, the customer receives that information after placing the order and can then decide whether to wait for the second half of the shipment. Two weeks later, Petunia's Emporium sends an e-mail message to Garden Escape's inventory system, informing it that the item is back in stock. If the customer did decide to wait for the next shipment, Garden Escape's electronic commerce system automatically would send an e-mail notifying him that the petunias were ready. The system works so seamlessly that there are only two points in the process where human effort is required to fulfill an order: at the front end, when the customer makes the order online, and when the supplier packs the items into a box.

For virtual and traditional companies alike, the successful implementation of new business models depends heavily on the ability to break down barriers among business partners all along the supply chain. For them, implementing electronic commerce is a critical part of realizing that vision. For IS, it is a grand opportunity. **CIO**

Staff writer Peter Fabris can be reached via e-mail at pfabris@cio.com.

"It used to be Company X competing with Company Y. Now it's supply chains competing with supply chains."

—Jon Kirkegaard

Online Resources

GE Information Services

www.geis.com/

LittleNet LLC

www.litlenet.com/

Unibex Inc.

www.unibex.com/

**Finally,
a color laser printer
loaded
with features,
starting at \$3500.**



**And other
modern miracles...**

Xerox Network A Different Line



3 ppm Color
6 ppm Fast Blue
12 ppm Black
Starting at \$3500.

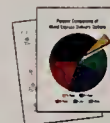
3 ppm Color
12 ppm Black

The New
DocuPrint C55
Color Laser Printer

XPrint 4925 Plus
Color Laser Printer



*Brilliant color. The most
fully featured color laser
printer for the price.*



*Great business color on
a range of paper including
heavy card stock.*



Laser Printers of Thinking

17 ppm Black
Shown with Optional
Lockable Mailbox

20 ppm Black

12 ppm Black



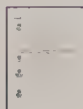
**DocuPrint 4517
Laser Printer**

**Xerox 4520
Laser Printer**

**DocuPrint 4512
Laser Printer**



*Modular design brings
high-end paper handling
capabilities to the desktop.*



*Speed and paper handling
capabilities maximize large
workgroup productivity.*



*Two-sided printing
plus an extra paper
tray at no extra cost.*

We've brought our best thinking in high-end printing to an affordable new line of monochrome and color network laser printers.

You'll find ingenious ways for making workgroups more productive—from superior paper handling capabilities to innovative new convenience features. You'll also find that printer installation and management is easier with new CentreWare DP software.

So if you're looking for smart new ways to make your network more productive, at affordable prices, think differently. *Xerox Network Laser Printers.*

Find out more about the Xerox difference and get free product literature. Call 1-800-34-XEROX, ext. 2992. In Canada call 1-800-ASK-XEROX, ext. 2992. Or stop by our website at <http://xerox.networkprinters.com> and see our powerful new line of network laser printers.



THE DOCUMENT COMPANY
XEROX

Six Months in review

An index of all major articles published in *CIO* in the first six months of 1997,
including a cross-reference by article type

**DECEMBER 15, 1996/
JANUARY 1, 1997**

**Special Issue: Electronic
Commerce**

1225. "The Speed of Light"
(Page 42)—the challenges of
transacting business on a net-
work have historic foundations.
But thanks to anywhere, any time
access, the scope and pace of
commerce will never be the same.
An introduction by Perry Glasser

1226. "The Electric Handshake"
(Page 48)—more than a new
type of transaction, online com-
merce is changing the fundamen-
tal buyer/seller relationship.
By Heath Row



**1227. "The Once and Future
EDI"** (Page 66)—if legacy EDI
software is integrated with the
Web and VANs are offered by
ISPs, variations on EDI will
keep revitalizing this important
EC tool. By Lynda Radosevich

1228. "Sticking with Strategy"
(Page 80)—when it comes to en-
gaging in electronic commerce,
3M is making sure each of its EC
initiatives supports business
goals. By Derek Slater

1229. "Moore's Law" (Page
92)—Geoffrey Moore's technol-
ogy adoption framework can
help CIOs plan for the wired
markets of the future. An inter-
view by Carol Hildebrand

**1230. "Blueprints for the
Electronic Store"** (Page 32)—

interactive electronic sales will
call for new IT architectures
and infrastructures. A Gartner
View column by Barbara Reilly

1231. "EC Payment Schemes"
(Page 100)—while commerce
moves across networks into the
next millennium, payment meth-
ods lag behind. An Emerging
Technology column by Elaine M.
Cummings

**1232. "Encyclopaedia Britanni-
ca's Larry Merrick"** (Page 112)—
memories of launching an online

product. A Shop Talk column by
Richard Pastore

JANUARY 15, 1997

**1233. "Getting In Touch with
Your Inner Web"** (Page 38)—
when Hewlett-Packard's corpo-
rate IS group began improving
its own services via an intranet,
the rest of the company couldn't
help but notice. By Tom Field

1234. "Powers of Persuasion"
(Page 46)—don't hesitate to put
the squeeze on your suppliers.

Categorically Speaking

Articles are numbered in sequence from the first issue of *CIO*.
(See previous December issues for guides to stories published prior to January 1997.) To find articles of interest, refer
to the category listings below. For example, readers interested in data warehousing would look up 1266 and 1322. An
online index of articles dating back to September 1994 can be viewed from The *CIO* Inner Circle at www.cio.com/CIO.
To purchase back issues or reprints, call Ancillary Products at 800 343-4935, Ext. 4539.

Business/Management Issues 1226, 1228, 1261,
1268, 1271, 1277, 1295, 1299, 1300, 1304, 1305, 1310,
1316, 1318, 1328

The CIO Role 1232, 1253, 1268, 1271, 1274, 1277, 1285,
1292, 1294, 1309, 1310, 1312, 1316, 1330

Client/Server-Open Systems 1263, 1265,
1313, 1315

Communications Technology/Networking
1242, 1245, 1252, 1291, 1319, 1323

Databases/Data Warehousing 1266, 1322

Enterprise Value/Return on Investment 1240,
1241, 1242, 1243, 1244, 1245, 1246, 1247, 1250, 1264,
1282, 1290, 1303, 1320

Global Issues 1245, 1251, 1252, 1253, 1275,
1297, 1314

Industry Overviews 1238, 1255, 1297, 1306, 1314,
1321, 1322, 1323

Information Assets/Knowledge Management
1233, 1235, 1243, 1248, 1270, 1286, 1293, 1295, 1298,
1305, 1307, 1327

IS Strategies 1234, 1239, 1254, 1258, 1259, 1262, 1272,
1279, 1283, 1289, 1294, 1296, 1301, 1315, 1328

Online Technology/Strategy 1225, 1226, 1227, 1228,
1229, 1230, 1231, 1232, 1233, 1261, 1263, 1280, 1285,
1311, 1324

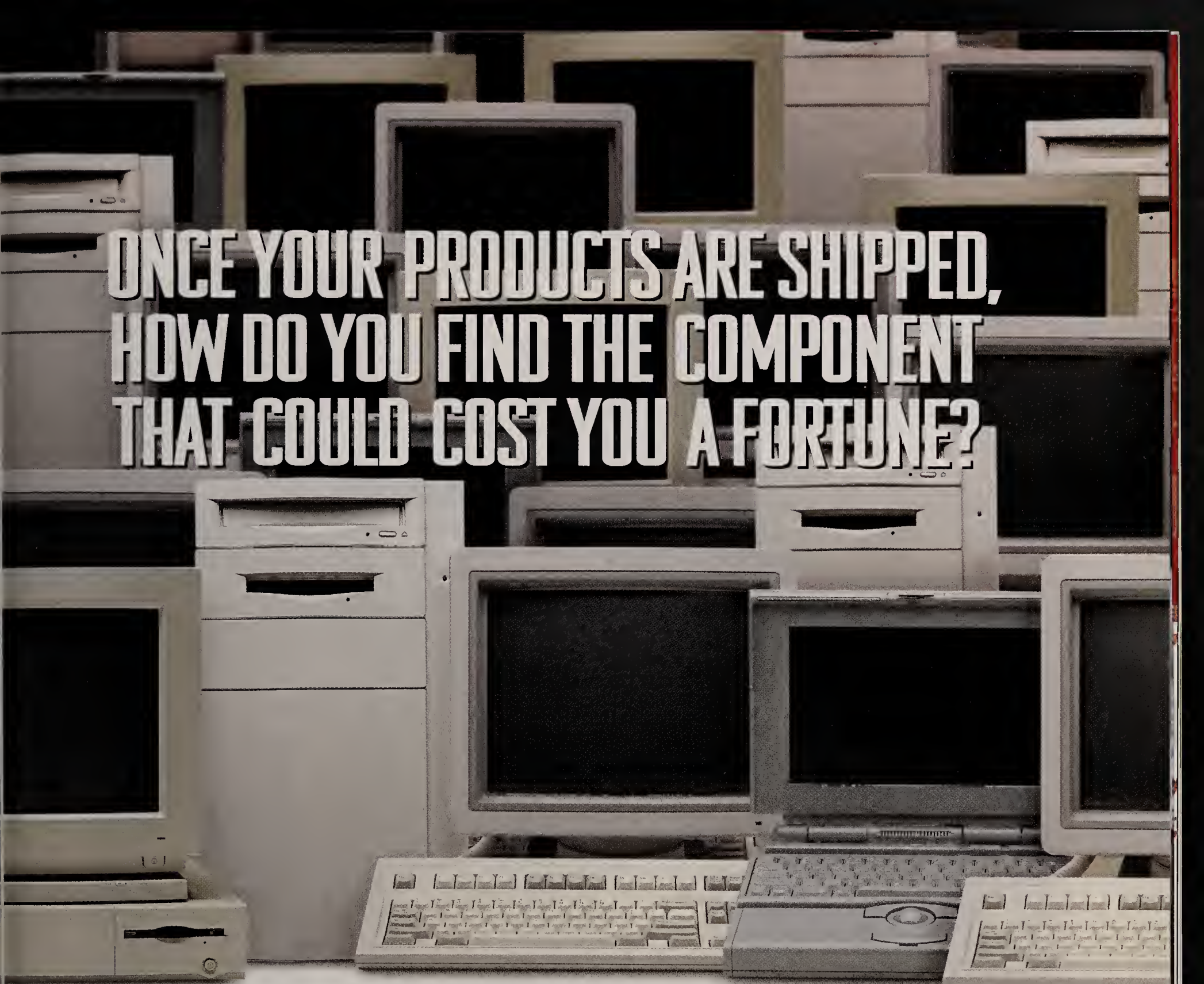
Organizational Change/Human Resources Issues
1237, 1256, 1267, 1269, 1278, 1286, 1288, 1308, 1326

Outsourcing/Supplier Relations 1276, 1287

Reengineering/Downsizing 1284, 1296

Technology Overviews 1231, 1249, 1257, 1258,
1259, 1260, 1273, 1281, 1291, 1293, 1302, 1311,
1313, 1319, 1329

User/Customer Relations 1236, 1244, 1246, 1283,
1289, 1317



ONCE YOUR PRODUCTS ARE SHIPPED,
HOW DO YOU FIND THE COMPONENT
THAT COULD COST YOU A FORTUNE?

JUST ASK US.



We're CiMatrix. And we invented the Data Matrix™ 2-D bar code. With it, you'll find it's possible to serialize individual parts and components. Now, with a serial number you can authenticate parts for warranty repair. And pinpoint component location. Even in seemingly hopeless, needle-in-a-haystack situations.

Such incredibly accurate tracking is due to the unique ability of the Data Matrix code to be permanently marked on even the smallest component. Our special method of encoding information allows the creation of an on-part microdatabase that can include production evidence.

CiMatrix offers a sophisticated family of 1-D and 2-D

bar code readers, terminals and a flexible communications network that allows real-time data collection. This lets you access enterprise-wide data and make more timely decisions than ever before. Decisions that improve quality control. Cut inventory losses. And reduce theft.

CiMatrix is part of RVSI, the worldwide leader in 1-D, 2-D and 3-D vision and illumination systems for industrial use. Our combined strengths let you access all levels of vision technology through one company.

Call CiMatrix at **617-821-0830**. We'll tell you how we just saved one of our customers several million dollars. And how we can help you to compute better profits. 



CiMatrix

CiMatrix, 5 Shawmut Road, Canton, MA 02021
Tel: 617-821-0830, Fax: 617-828-8942

STORY INDEX

Influencing vendors to satisfy corporate needs is simply good business. By Miryam Williamson

1235. "Out of the Stacks" (Page 54)—today's vast corporate libraries come in just about every medium. But how can you avoid having your information resources gather dust? By Heath Row

1236. "Delicate Negotiations" (Page 30)—hammering out agreements with your staff, peers and bosses doesn't have to be a fight if you know how to bargain well. An Executive Counsel column by Margaret A. Neale

1237. "The Skills That Thrill" (Page 34)—tracking employee competencies can help companies recruit, match people to jobs and even develop their staffs. A Think Tank column by Tom Davenport



1238. "Makeover Medicine" (Page 62)—in times of crisis, a healthy dose of IT can help businesses rebound, rebuild or regain their competitive edge. A Reporter's Notebook column by Jennifer Bresnahan

1239. "Advanced Technology Groups" (Page 70)—if ATGs truly want to have an impact on the business, they must come down from their ivory towers. An Emerging Technology column by Jennifer Bresnahan

FEBRUARY 1, 1997

Special Issue: The Enterprise Value Awards

1240. "A New Value Equation" (Page 40)—this year's EVA recipients possess the key elements to develop successful systems.

1241. "Value Judgments" (Page

46)—a panel of IS cognoscenti discusses IT systems and the businesses they support. By Christopher Koch



1242. "A Cure for Broken Records" (Page 54)—HMO MacGregor Medical discovered that taking good care of its patients can also be good for the bottom line. By Alice Dragoon

1243. "Semper Fidelity" (Page 62)—a client/server system means peace of mind for customers and a competitive advantage for Fidelity Investments. By Jennifer Bresnahan

1244. "A Good Connection" (Page 70)—Bell Atlantic improves communication and profits by cutting the static between salespeople and customers. By Tom Field

1245. "Net Results" (Page 78)—a worldwide corporate network based on TCP/IP helps Schlumberger's clients strike oil. By E.B. Baatz

1246. "Banking on the Relationship" (Page 84)—IS helped Chase Manhattan develop more profitable relationships with its small and midsize business customers. By Tom Field

1247. "Software Economics 101" (Page 32)—studying the world's software development trends can help CIOs make the grade. A Metric Systems column by Howard A. Rubin

1248. "Adapt or Die" (Page 36)—to value IT properly requires viewing the enterprise as an evolving ecosystem. A Meta View column by Dale Kutnick and Karen Rubenstrunk

1249. "Integrated Messaging" (Page 90)—the benefits of inte-

grated messaging are compelling, but early adopters must consider a number of issues before making a decision. An Emerging Technology column by Curtis F. Franklin Jr.

1250. "Texas Department of Human Services" (Page 102)—as a result of going electronic, the state of Texas and the federal government have saved millions of dollars and taken a big bite out of fraud. A Working Smart column by Paula Jacobs

FEBRUARY 15, 1997

Special Section: IT in South America

1251. "Sud América" (Page 48)—when the boss distrusts IT, a dial tone is a sometimes thing and the software is in a foreign language, it's just another day in the life of a South American CIO. By Peter Fabris

1252. "Along the Andes" (Page 56)—early market reforms and state-of-the-art telecommunications leave companies in Chile uniquely positioned to take advantage of the latest in IT. By Peter Fabris

1253. "Southern Exposure" (Page 62)—the roles of IT and information executives are gaining importance in South America as competition in the region's markets heats up. By Peter Fabris



1254. "Quantum's Leap" (Page 40)—one computer manufacturer's risky decision to overhaul its worldwide business systems in a single bound paid off. By Lynda Radosevich

1255. "Auto Pilot" (Page 70)—the auto industry is using IS to help retain existing customers and improve customer loyalty.

A Preparing for Change feature by Dan Gross

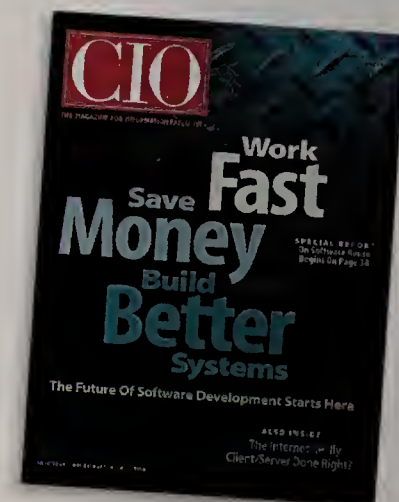
1256. "Minimal Assistance" (Page 32)—want to reskill your employees? Then you have to deliver on management's meaningless slogans. An Executive Counsel column by Christopher Koch

1257. "Data and Telecommunications Convergence" (Page 78)—CIOs feel the pressure to consolidate data, telephony and video technologies. An Emerging Technology column by John Edwards

MARCH 1, 1997

Special Report: Software Reuse

1258. "More Lives Than a Cat" (Page 34)—IS shops that institute component-based development reduce failure, embrace efficiency and augment the bottom line. An introduction by Miryam Williamson



1259. "Avoiding the Point of No Reuse" (Page 38)—CIOs who've been there say reaping the benefits of software reuse hinges on overcoming a bevy of cultural barriers. By Miryam Williamson

1260. "Bits and Pieces" (Page 56)—different kinds of component-based development still require the same technology. By Miryam Williamson

1261. "To Catch a Thief" (Page 68)—security veteran Bill Hancock helps CIOs safeguard company secrets by finding loopholes in networks, firewalls and building security. An interview by Jennifer Bresnahan

1262. "Once Is Not Enough" (Page 28)—embarking on a reuse program requires more than simply announcing the pro-

EXERCISING ALL YOUR MIPS?

Millennium does.

Many mainframe purchases are based on Total MIPS — but Productive MIPS are the real test of value.

Consider the Amdahl Millennium™ family of CMOS-based servers — S/390® compatible mainframes that deliver more Productive MIPS per dollar than any other CMOS-based server. Bar none.

Millennium's extraordinary value derives from its uniquely muscular architecture. Unmatched caching with up to 30 times more capacity for optimum processor utilization. Flexible partitioning for load-matched resource allocation.

Plus many more innovations to keep MIPS hard at work on the mission-critical workloads of your business.

Interested in servers with a stronger work ethic?

Talk to Amdahl.



MILLENNIUM

Call for free white paper on
Performance vs. Capacity.
Contact us at (800) 223-2215
or www.amdahl.com

amdahl

amdahl
BRING US YOUR HARD PROBLEMS™

© 1997 Amdahl Corporation. Amdahl is a registered trademark and Millennium is a trademark of Amdahl Corporation. S/390 is a registered trademark of International Business Machines Corporation. All other trademarks and products are the property of their respective owners.



***When you're famous for
making BLT
you don't want to run***

© 1997 Microsoft Corporation. All rights reserved. Microsoft and

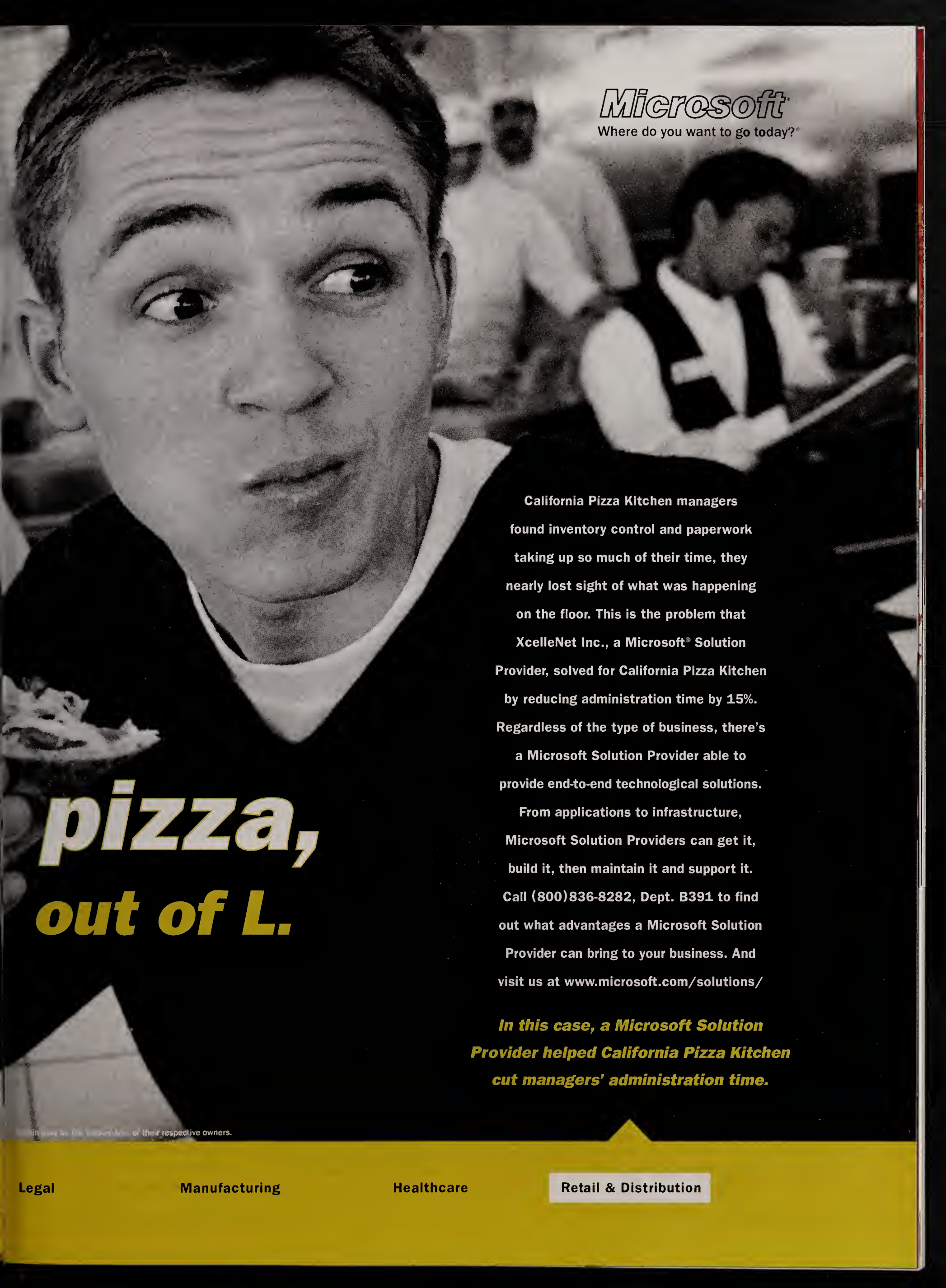
are trademarks of Microsoft Corporation. Other product and company names mentioned

Microsoft®
SOLUTION PROVIDER

Accounting

Hospitality

Banking



Microsoft

Where do you want to go today?®

pizza, out of L.

California Pizza Kitchen managers found inventory control and paperwork taking up so much of their time, they nearly lost sight of what was happening on the floor. This is the problem that XcelleNet Inc., a Microsoft® Solution Provider, solved for California Pizza Kitchen by reducing administration time by 15%. Regardless of the type of business, there's a Microsoft Solution Provider able to provide end-to-end technological solutions.

From applications to infrastructure, Microsoft Solution Providers can get it, build it, then maintain it and support it. Call (800)836-8282, Dept. B391 to find out what advantages a Microsoft Solution Provider can bring to your business. And visit us at www.microsoft.com/solutions/

In this case, a Microsoft Solution Provider helped California Pizza Kitchen cut managers' administration time.

© 1999 Microsoft Corporation. All rights reserved. Microsoft, the Microsoft Dynamics logo, and the Microsoft Dynamics logo are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Legal

Manufacturing

Healthcare

Retail & Distribution

STORY INDEX

gram's existence. A Gartner View column by Richard Hunter

1263. "Beyond Client/Server" (Page 74)—are Web-based applications "client/server done right"? An Emerging Technology column by Curtis F. Franklin Jr.

1264. "Clawson Concrete's Fleet-Tracking System" (Page 84)—streamlining the dispatch process increased delivery rates and accuracy and improved customer service. A Working Smart column by Derek Slater

MARCH 15, 1997

1265. "Platform Diving" (Page 44)—heavy-duty transaction processing can be done in a client/server environment that's built for the right task and the right number of users. By Derek Slater

1266. "Blueprint for Success" (Page 56)—smart organizations are using data models to escape the snares of data warehousing. By Jennifer Bresnahan



1267. "Team Payers" (Page 68)—IS groups may respond better to new group compensation schemes. By Derek Slater

1268. "Just Thinkin' About Tomorrow" (Page 78)—MIT researchers look to the future to prepare for business for the 21st century. An interview by Richard Pastore

1269. "Inside and Out" (Page 26)—leading change requires looking beyond an organization's walls. A Change Agent column by Carol Hildebrand

1270. "Processing Process Information" (Page 32)—know much about how your company gets work done? A Think Tank column by Tom Davenport

1271. "The CEO Agenda" (Page 36)—some CEOs who attended the Fortune 500 Forum realize the strategic importance of IT, but they're not so certain about their CIOs. A Reporter's Notebook column by Lynda Radosevich

1272. "The Lease You Can Do" (Page 82)—giving finance the lowdown on IS leasing can save money. An Expert Advice column by James M. Johnson

1273. "Global Positioning Systems" (Page 86)—PCMCIA cards are transforming GPS into an everyday business tool. An Emerging Technology column by John Edwards

1274. "Aetna's Glen Salow" (Page 100)—the CIO as a blue-collar worker. A Shop Talk column by Elaine M. Cummings

APRIL 1, 1997

1275. "Far From the Bank on the River Charles" (Page 36)—economic growth throughout South America poses some welcome problems for BankBoston's information executives. By Peter Fabris

1276. "Caveat Emptor: An Outsourcing Buyers Guide" (Page 46)—the right choice requires a sound strategy for distinguishing and deciding among the bewildering array of vendors. By Tom Field

1277. "Taking Care of Business" (Page 62)—the eighth annual CIO/Ernst & Young survey reveals that CIOs and their bosses and peers are beginning to agree on the strategic role of the top IS executive. By Heath Row



1278. "A Good Staff Is Hard to Find...and Keep" (Page 76)—IS executives and consultants discuss the challenges of—and strategies for—doing both.

By Richard Pastore

1279. "Farewell to the Big Bang" (Page 32)—vendors, users and executives alike will have to adjust to new rules as component-based packaged applications make rollouts ongoing affairs. A Forrester View column by Bobby Cameron

1280. "Webel Without a Clue" (Page 84)—entrepreneurial heavyweight Ezra Poundcake describes his rags-to-slightly-higher-quality-rags career on the Net. A CIO Light column

1281. "Real-Time Collaboration Tools" (Page 90)—CIOs working with an increasingly mobile workforce look to group decision support. An Emerging Technology column by Heath Row

1282. "Amdahl's Sales Compensation System" (Page 102)—this company turned to an integrated system to motivate salespeople. A Working Smart column by Paula Jacobs

APRIL 15, 1997

1283. "Weighing the Nos and Cons" (Page 48)—trying to figure out how to set priorities for IT projects? Start with a spreadsheet. By Miryam Williamson

1284. "Getting the Lead Out" (Page 62)—by standardizing IS operations and cutting costs, Mobil honed its competitive edge. By Daniel Gross

1285. "Web War" (Page 74)—when webmasters and CIOs clash, the chaos rivals that of a bad B-movie. By Carol Hildebrand

1286. "The Next Wave" (Page 84)—a consultant details what he calls the "Third Revolution." A book excerpt by Michael L. Dertouzos

1287. "Lump It and Like It" (Page 32)—fixed-price consulting can prevent pricing woes. An Executive Counsel column by Christopher Koch

1288. "Storming the Ivory Tower" (Page 38)—universities and companies need to learn to work together better. A Think Tank column by Tom Davenport

1289. "Numbing Your Rollout Pain" (Page 42)—systems reengineering rollouts should be structured around user needs. An Ex-



pert Advice column by Britta Schatz and Karen Finigan

1290. "Case in Point" (Page 96)—participants at CIO's recent Enterprise Value Retreat advised a family business how to stay competitive. A Reporter's Notebook column by Tom Field

1291. "Is ISDN Soup Yet?" (Page 106)—high-speed data transfer technology comes of age. An Emerging Technology column by John Edwards

1292. "Bose Corp.'s Warren Harkness" (Page 118)—a total quality manager talks about life beyond IS. A Shop Talk column by Richard Pastore

MAY 1, 1997

1293. "Push IT" (Page 58)—push technology is not hassle-free, but you can't afford to ignore it. By Lynda Radosevich

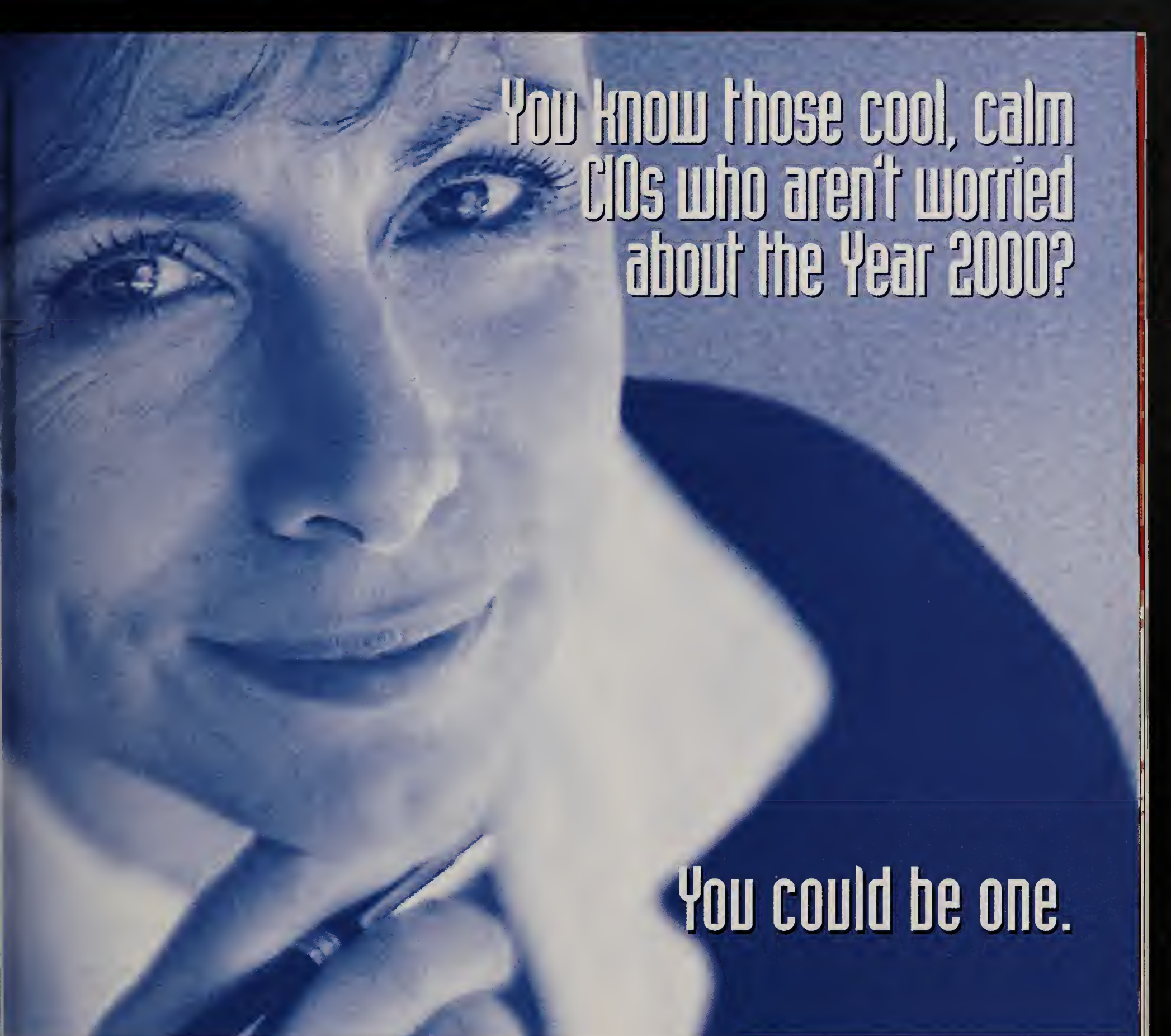
1294. "A Tough Sell" (Page 74)—devising the ideal infrastructure plan is half the battle. Convincing management to invest in it can be even harder. By Christopher Koch

1295. "The Data Game" (Page 90)—companies are learning how to turn customer information into product—and profit. CIOs need to help call the plays. By Derek Slater

1296. "A Powerhouse Lightens Up" (Page 98)—Westinghouse Electric needed a new computing infrastructure before the lights went out. But IS had to fix itself first. By Tracy Mayor

1297. "Oil Under Pressure" (Page 110)—virtual reality and co-opetition are making oil exploration a less slippery business. A Preparing for Change feature by Gene Koprowski

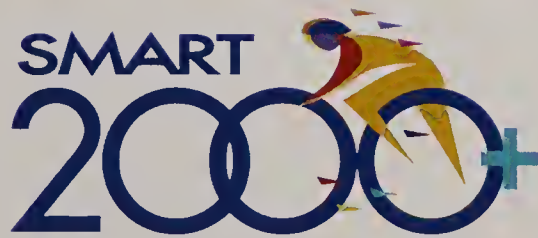
1298. "Reap What You Know"



You know those cool, calm
CIOs who aren't worried
about the Year 2000?

You could be one.

Here's how. Partner with BDM to clear the hurdles to compliance with calm assurance. We know how to successfully manage all aspects – business and technical – of century date change challenges. We'll work your top priorities and hottest issues with a dedicated project team to complement your team's efforts and help mitigate risks and control costs. Plus our multi-phased SMART/2000+SM solution is platform, language, and tool independent to meet your specific needs. Our resources can extend yours to allow you to continue business as usual.



SMART/2000+ is flexible, too. If you need an end-to-end solution, this is it. Or count on us to address and resolve specific phases of your Year 2000 problem, like migration planning, renovation, and test.

Either way, we'll help you stay cool, calm, and in control. Our confidence comes from experience. Yours will come from the satisfaction of meeting the millennium challenge in time. Let's get started. Call us at 1-800-565-0162, e-mail to Year2000@bdm.com or visit us on the Web at www.bdm.com.

BDM[®]
The Information Technology Company

STORY INDEX

(Page 118)—can you really “manage” what people know? Some CIOs are trying to find out. By Christopher Koch

1299. “The Greenhouse Effect” (Page 38)—isolating change gives employees the freedom to experiment with new processes—and the opportunity to learn from mistakes without affecting the bottom line. A Change Agent column by Carol Hildebrand

1300. “Capturing Innovation” (Page 50)—most people have preconceived ideas about how innovation occurs. A new study debunks some of the myths. An Expert Advice column by Mary Silva Doctor

1301. “Three Architectural Sins” (Page 124)—when setting up an architecture, always keep the basics in view. A Meta View column by Larry R. DeBoever and Richard D. Buchanan

1302. “Virtual Reality” (Page 128)—practical uses give a soft science a good name. An Emerging Technology column by John Edwards



1303. “Pride Enterprises’ CIM System” (Page 142)—this system centralized processing for a Florida company charged with managing the state’s prison industries. A Working Smart column by Heath Row

MAY 15, 1997

1304. “Share & Share Alike” (Page 48)—the time is right for CIOs to consider introducing their organizations to shared services. By Tom Field

1305. “Up Close and Personal” (Page 62)—new technologies make data collection easier, but they also may violate consumers’

sense of privacy. By Jennifer Bresnahan

1306. “Degrees of Change” (Page 78)—the new demands of higher education are pushing the IT grading curve. By Megan Santosus

1307. “The Bigger Picture” (Page 88)—this new book asks us what we want from information and provides a sane approach to how to get it. A book excerpt by Tom Davenport



1308. “The People Side of Change” (Page 100)—panelists at a recent CIO Perspectives conference share their experiences, strategies and mistakes. A roundtable by Abbie Lundberg

1309. “The Honeymooners” (Page 36)—the experiences of two CIOs suggest strategies the newly hired can pursue to keep the bloom on the rose. An Executive Counsel column by Cheryl Dable

1310. “Alignment Revisited” (Page 44)—if you build the right model and commit to the change, you can finally link the strategy of business and IT. An Expert Advice column by Laraine Rodgers

1311. “Enter the Extranet” (Page 106)—what can organizations gain from including outsiders in their intranets? An Emerging Technology column by Curtis F. Franklin Jr.

1312. “Rosenbluth’s Dean Sivley” (Page 118)—marrying the marketing and IS functions. A Shop Talk column by Richard Pastore

JUNE 1, 1997

1313. “NC: The New Wild

Frontier?” (Page 42)—experts say network computers will integrate with PCs, not replace them. By Carol Hildebrand

1314. “Competition Calling” (Page 58)—telecommunications companies strive for customer loyalty in a cutthroat market. A Preparing for Change feature by Christopher Koch

1315. “By Remote Control” (Page 72)—without proper planning, enterprise systems management is a migraine waiting to happen. By Derek Slater

1316. “Are We There Yet?” (Page 86)—for the third consecutive year, CIOs responding to CSC’s annual IS survey rank aligning IS and corporate goals as the top concern. By James P. Saviano

1317. “The Press for More Options” (Page 30)—soon companies will need to expand their call centers’ capabilities or risk losing business. An Expert Advice column by David M. Rappaport

1318. “The Technology Democracy” (Page 38)—a “democratic” model of technology governance encourages creativity and growth. A Forrester View column by Waverly Deutsch

1319. “Look Ma, No Wires!” (Page 100)—with wireless technology, remote access just got easier. An Emerging Technology column by John Edwards



1320. “Lowell General Hospital’s Internet Solution” (Page 112)—a Massachusetts-based hospital is using the Internet to educate local consumers. A Working Smart column by Megan Santosus

JUNE 15, 1997

Special Report: Health Care

1321. “Medical Exam” (Page 42)—this special report on the health-care industry looks at how providers are using IT to improve the health of their patients—and their businesses. An introduction by Jennifer Bresnahan

1322. “A Delicate Operation” (Page 44)—the experiences of those in the business of curing patients could help you come up with a prescription for a healthier business. By Jennifer Bresnahan

1323. “Managed Share Networks” (Page 58)—here’s how three health-care organizations are overcoming the obstacles to effective information sharing. By Tom Field

1324. “EC Riders” (Page 70)—how can you streamline your supply chain to include business partners? The answer lies in electronic commerce. By Peter Fabris

1325. “Six Months in Review” (Page 82)—an index of all major articles published in CIO in the first six months of 1997, including a cross-reference by article type.

1326. “Cutting Deals with HR” (Page 30)—paying staff what they’re worth means selling HR. An Executive Counsel column by Christopher Koch

1327. “Known Evils” (Page 34)—repent and save your company from its witless ways. A Think Tank column by Tom Davenport

1328. “The Sky Is Not Falling” (Page 92)—stocking up on canned goods and shotguns may not be the best strategy for confronting the year 2000 problem. An IDC View column by Thomas D. Oleson

1329. “The Smallest Systems” (Page 98)—scoping out the future of palmtops in the enterprise. An Emerging Technology column by Curtis F. Franklin Jr.

1330. “Penn Mutual’s Susan Kozik” (Page 110)—enterprise-wide customer service. A Shop Talk column by Elaine M. Cummings

☐ YES! I WOULD LIKE MORE INFORMATION
ON RATIONAL'S SOLUTION FOR AUTOMATING
COMPONENT-BASED DEVELOPMENT

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Tel* (_____) _____

Fax (_____) _____

Email _____

*Required to process your request.

RATIONAL
SOFTWARE CORPORATION



No postage
necessary if
mailed in the
United States

BUSINESS REPLY MAIL

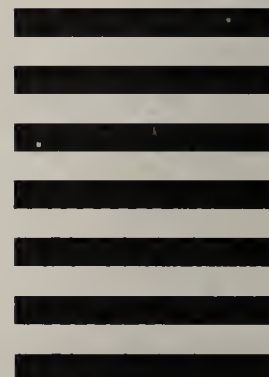
FIRST CLASS MAIL PERMIT NO. 702 BURLINGTON, MA

POSTAGE WILL BE PAID BY ADDRESSEE

RATIONAL SOFTWARE

One Burlington Woods

Burlington MA 01803-9946



“We release over 20 products on 8 major database platforms several times per year, so we needed a serious automated testing tool we could rely on. SQA Suite™ won hands down. It's helped accelerate our development projects and increase quality. Results were so good, we're bundling SQA Robot™, one of SQA Suite's core components, in PeopleSoft 6 at no additional cost. Now, as our customers modify their PeopleSoft® applications, they can maintain the same level of quality that ships with new PeopleSoft applications.”

“SQA Suite is so good, we embedded it in PeopleTools.”

—Peter Nasca, V.P. of Release Processes, PeopleSoft, Inc.

Interested in building higher quality applications in less time? Trust SQA Suite, winner of more industry awards than any other automated testing tool. You'll get a comprehensive solution for ensuring the quality of your PeopleSoft applications, and integration with Rational's industry-leading family of software tools for Automating Component-Based Development. Take the first step. Call 1-800-609-1922 for a **FREE** evaluation copy!

RATIONAL
SOFTWARE CORPORATION

The word Rational and Rational's products are trademarks of Rational Software Corporation. PeopleSoft and PeopleTools are registered trademarks of PeopleSoft, Inc.

“We scrutinized every testing solution for enterprise-level client/server applications. SQA Suite was the clear winner.”



Free White Paper — “Automated Testing of PeopleSoft Applications: The SQA Suite Solution.”
Call 1-800-609-1922 or visit www.rational.com

The Sky Is Not Falling

The year 2000 poses a real and serious IT problem, but things may not be as dire as they seem

BY THOMAS D. OLESON

Editor's Note: This survey has drawn a lot of fire from leading year 2000 watchers, who argue that asking senior executives if this is going to be a problem in their companies is like asking smokers if they expect to get cancer. But the specific data collected in the survey bears out many of IDC's conclusions. Nevertheless, time is running short. Any CIO who does not think this is a serious threat had better think again. And think fast. For CIO's view on the subject, see the July editor's letter.

MANAGEMENT HAS HEARD the warnings from the Chicken Little prognosticators, considered the dangers and taken action. The year 2000 date coding problem is no longer (if it ever was) catastrophic and out of control. The sky will not fall on Jan. 1, 2000; financial failure will not befall 30 percent of corporations; there will be no mass exodus of lawyers from ambulance chasing to the more lucrative field of corporate year 2000 bashing. International Data Corp. (IDC), a sister company of CIO Communications Inc., reached these conclusions following a 1996 six-industry survey of CEOs, CFOs and CIOs and other IS managers in 503 U.S.-based companies with 1995 revenues of at least \$100 million.

The year 2000 problem came to the attention of management in a September 1993 *Computerworld* article by Peter de Jager. The warning, how-

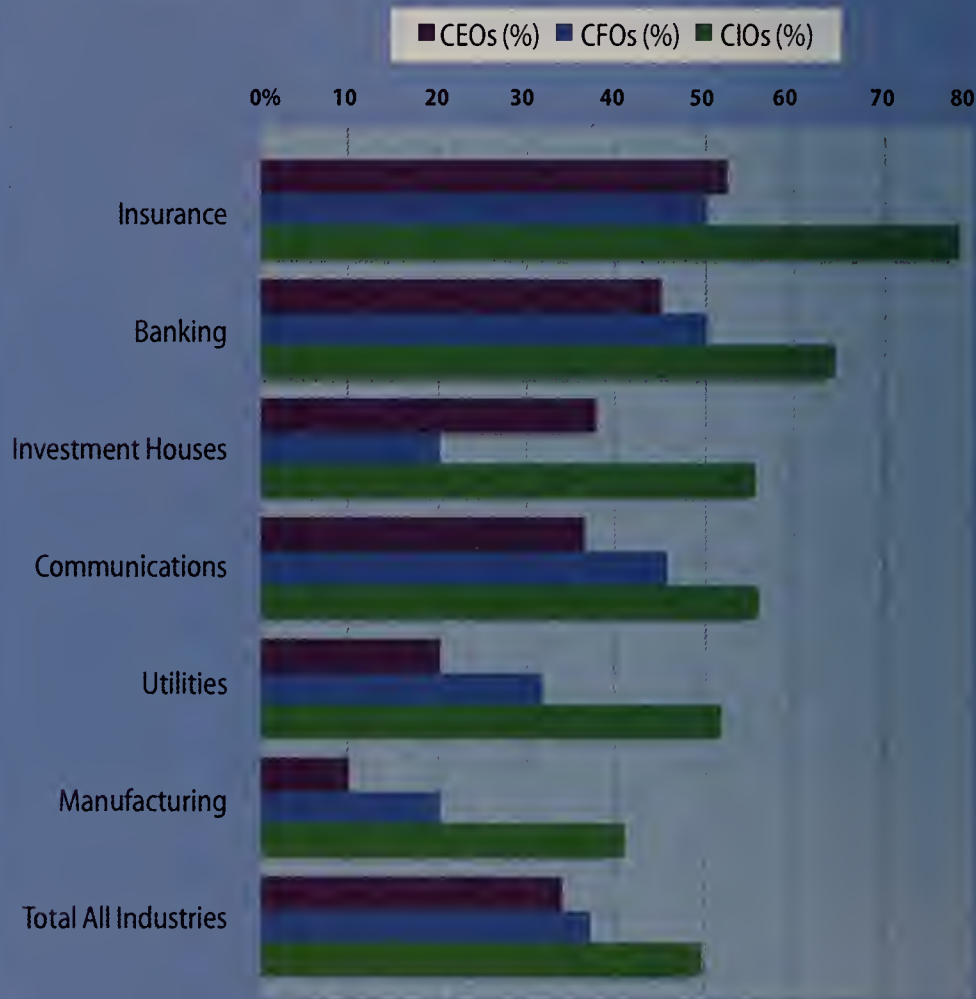
ever, came as no surprise to IS personnel in industries that already used dates as a key element in their business models. Insurance companies, having projected life insurance and annuities well into the next century, had selectively addressed the issue as early as

the 1960s, when actuarial programs were written using four-digit year fields. By 1970, banks and investment houses had addressed the problem of 30-year mortgages and bonds. By 1973, real estate investors had faced the problem when residential property was assigned a 27.5-year depreciation schedule. The awakening occurred only in industries where dates were not a critical element of the business process.

By the end of 1993, less than 3 percent of the newly awakened U.S.-based companies had begun correcting the year 2000 problem. Another 15 percent joined the process in 1994. Then the floodgates opened. Each quarter for the next two years, 5 to 8 percent of all

Who's Pressing the Panic Button?

The percentage of industry chiefs who believe the year 2000 problem is a major business issue



SOURCE: IDC YEAR 2000 SURVEY OF 500 EXECUTIVES, 1996

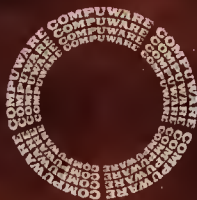
It was supposed to
be the launch of a
development *project...*

Not the project *manager.*

Should've used UNIFACE

It's more than
a development
product. It's a
complete solution
to put complex
enterprise applications
into production —
from legacy to
client/server to the
Internet. Ask
any of our 3,000
worldwide customers.

For a white paper on
creating enterprise
systems for the
Internet, call us.



COMPUWARE®

www.compuware.com

1-800-365-3608

uniface_info@compuware.com

IDC View

companies began year 2000 projects. The process peaked in the first quarter of 1996, when over 20 percent of all companies commenced year 2000 projects. As 1997 began, only 18 percent had not begun the renovation effort, and by mid-1997, virtually all companies will have started the effort. Some might consider that to be too late. Whether it is or not really depends on a company's degree of date reliance.

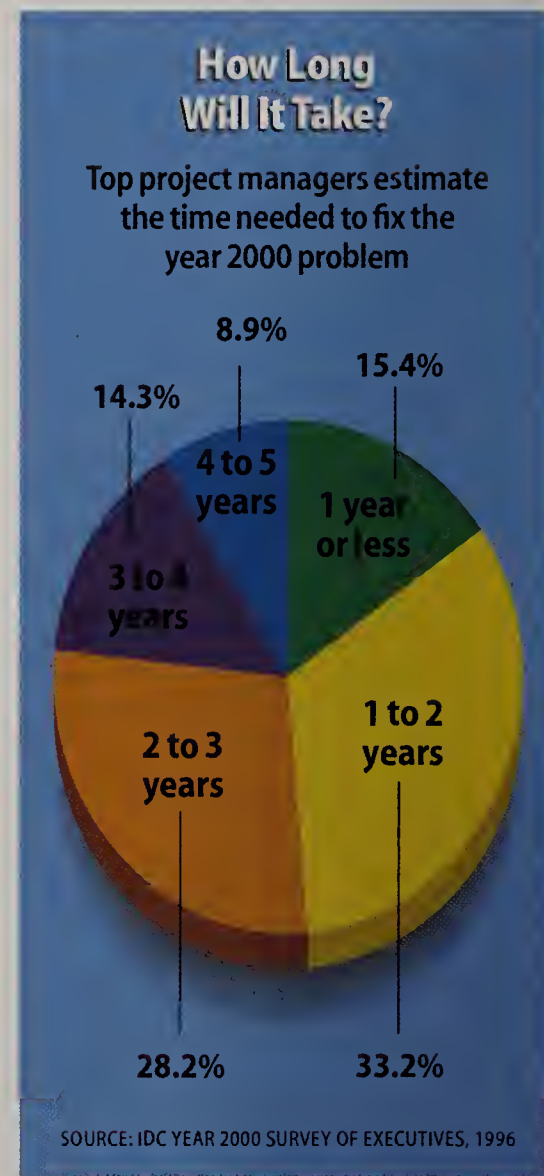
One to 12 percent of companies' lines of code relate in some way to dates. Within manufacturing, generally speaking, the most date-dependent applications are the financial, accounting, payroll and inventory systems. When it comes to attending to the problem, many of those applications are candidates to be replaced by packaged software that is year 2000 compliant. Banks, investment firms and insurance companies, however, find dates ubiquitously distributed among business applications written largely in-house. Because they are more exposed to dates, those financial industries addressed the year 2000 problem sooner. Moreover, their executives are far more aware of and concerned about the problem than are executives in other industries (see "Who's

Pressing the Panic Button?" Page 92).

IDC says the discrepancies among executives' estimates of the severity of the problem can be explained by the varied roles the executives fill. For the CIO, a 500-pound gorilla named Millennium sits grinning squarely in the middle of the desk. The year 2000 problem is the biggest maintenance project ever to hit the department. But for the CFO, the IS function constitutes only about 2 percent of the corporate budget, and as long as the CIO believes the problem is under control, it may be serious but not catastrophic. Finally, for the CEO who has heard that there is a gorilla loose, since balancing all elements of a large corporation and keeping the proper perspective is essential, the beast is probably tame. After all, the creature has not yet bounded through the office door.

The arm's-length approach to the year 2000 problem by the CFO and CEO does not mean that they have not considered the potential damage to the corporation (see "What's the Big Deal?" below). Note that while all executives place impact on the customers first in their concern, their estimates of damage to other aspects of the business vary with how close they are to the problem.

Although the degree of concern depends on the degree of date dependency, such uniform patterns and results are not consistent with the claims that the Chicken Little crowd loudly espouse. And when asked to predict when the year 2000 effort will be completed, 22 percent of companies said they plan to finish in 1997, 48 percent of survey respondents predicted 1998 and 15 percent said 1999. The bottom line? There may be disruption in some services, but there will be no massive financial failure among large companies. Corporate executives have pegged it right.



What's the Big Deal?

The percentage of chiefs who believe the year 2000 problem will affect the following aspects of business



What to Do

Although 38 percent are keeping the year 2000 effort unified, most firms are breaking their projects into subprojects—14 per company, on average. Insurance companies have the highest average at 35 subprojects. We expect some of the multiple projects to be completed late. While project creep is one expected reason for late completion, a second frequently cited expectation for lateness is lack of resources (see "Caught In the Middle," Page 96).

Project managers base year 2000 project schedules on certain assumptions about the availability of internal and external resources. During the active years of the year 2000 effort, U.S. businesses, including government at all levels, will spend about \$115 billion on correcting the year 2000 problem, with \$69 billion of internal spending going to the IS organizations and \$46 billion going to external spending on professional services vendors, software and hardware.

The money will be raised by deferring about \$17.6 billion on projects that must wait until the year 2000 renova-

If this thing is half the Web-based,
intranet-ready knowledge resource
you claim it is, I'd be
more than a little interested.
Give me a call and a PIN.

Give me
ge resou

Name _____ Title _____

Company _____ Type of Business _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____ e-mail _____

Company Revenues _____

How many people in your company would potentially use Business Browser? ☐ < 25 ☐ 25-100 ☐ 100-500 ☐ >500

ONE SOURCE

www.onesource.com

OneSource Information Services, Inc. ▲ 150 CambridgePark Drive ▲ Cambridge, MA 02140
Phone 800 554-5501 ▲ Fax 617 441-7058 ▲ Business Browser from OneSource.com



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS

PERMIT NO. 8793

BOSTON MA

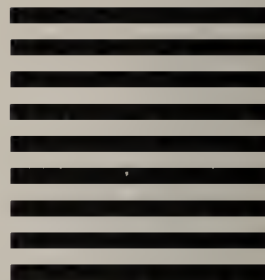
POSTAGE WILL BE PAID BY ADDRESSEE

LINDA MILLER

ONESOURCE INFORMATION SERVICES, INC.

150 CAMBRIDGEPARK DRIVE

CAMBRIDGE, MA 02140-9865



Due to technical
difficulties,
nobody else can
offer this kind
of intelligence at
this
kind of price.

e to
nobody
at

>> Business Browser is the most powerful, instantly usable Web-based knowledge resource you can buy. >> It gives you unlimited access at a fixed price.

>> You can have one on the desktops of everyone in your company for as little as \$60 each, per year. >> You can have one on your own desktop for free, for a week's trial.

>> Business Browser can be the cornerstone of your entire corporate knowledge architecture. It takes dozens of sources you once had to cobble together, and un-cobbles them. It integrates them, hyperlinks them, combines them with analytical tools and makes them intranet-ready for unlimited enterprise-wide distribution.

>> One search gives you all the business intelligence you need to know about an industry or company. Their financials, their products, their competitors, their market shares, their press, and how much money their CIOs make.

>> So what? So your people can do in 72 seconds what now takes them 72 hours.

>> To believe it, you must see it. Give us a call at 800-554-5501, and we'll give you a password. >> Business Browser. From OneSource Information Services.

ONE SOURCE
www.onesource.com

For your FREE trial of Business Browser, call 800-554-5501.

OneSource Information Services, Inc. ▲ 150 CambridgePark Drive ▲ Cambridge, Massachusetts 02140

IDC View

tion is complete. Those deferred projects will offset the income of professional services companies so that their net increase will be only \$29.6 billion. Similarly, software spending will increase to \$7.2 billion, and hardware spending will actually decrease by about \$300 million.

To meet the demand, services companies will have had to increase their professional staffs by 7.5 percent in 1997, but by March, IDC had seen no signs to suggest services companies are doing that. Even if the staffing increase were to occur in the near future, the availability of talent is a zero-sum game. In order to increase staff in any meaningful way, the services companies will have to recruit trained talent from the very companies clamoring for their services. Should that situation occur, the shift of resources within the companies themselves to support the year 2000 renovation will cripple other development efforts even further.

The strategies adopted by project managers for meeting the year 2000 problem range from fast and cheap renovation to expensive and time-consuming business process reengineering. Renovation has the fewest long-range benefits, while business process reengineering would yield the greatest benefit to the corporation.

IDC concludes that the year 2000 problem will cause some minor disruption in services to customers and will delay many of the development projects in the pipeline, though companies with large year 2000 efforts may be more heavily affected. Now that the projects are underway, IDC recommends that anticipating the impact of potentially delayed projects be a key focus for the IS leadership for the next year. Once that impact has been identified, the CIO will be able to take remedial action, communicating with department heads on delayed projects and discussing where customers may be caught short by delayed year 2000 compliance.

Short-term solutions, many based on disaster recovery scenarios, can be developed by the affected departments. As for testing new incoming data from outside sources for year 2000 compliance, checking for a four-digit data field is a crapshoot at best because the data may be fine for some time and then produce an error as a seldom-used branch of a program is invoked. It might be best to solve this prob-

Caught In The Middle

Midsized companies expect to have the greatest struggle with year 2000 problems

OF THE 19 PERCENT OF COMPANIES identifying the availability of qualified staff as a major problem, only 2 percent considered it unsolvable. Staffing was considered most critical among the companies with revenues of \$500 million to \$1 billion. Companies with more than \$1 billion in revenues or less than \$500 million in revenues were not as troubled. Those same midsized companies also considered a number of problems with vendors as serious or unsolvable. Midsized companies appear to be the segment of industry that is most vulnerable to year 2000 problems.

Getting information from vendors on their year 2000 compliance and coordinating with vendors to install the compliant packages are serious problems among all companies primarily because of lack of communication from the vendors. As a result, companies are performing their due diligence in the absence of vendor cooperation. One or more packages were being replaced in 38.6 percent of the companies. Packaged software was being replaced less often because of year 2000 problems (41.9 percent) than because customers found another package they liked better (54.7 percent). —T.D. Oleson

Where's the Problem?

Percentage of 503 year 2000 project managers who rated the following series of problems as "serious" or "unsolvable"

Assigning sufficient qualified staff to project

19.3%

Amount of time remaining to complete project

14.2%

Getting information from vendors on compliance

14.0%

Gaining top management support

12.0%

Coordination with outside vendors and clients

11.8%

Budgeting and paying for project

11.1%

Finding appropriate tools to aid project

9.4%

Project management effort

9.2%

Agreeing on project design

8.7%

Gaining internal customer support

7.4%

Finding year 2000 vendors

4.3%

Evaluating year 2000 vendors

3.9%

SOURCE: IDC YEAR 2000 SURVEY OF EXECUTIVES, 1996

lem contractually, not technically, by negotiating a liability clause into all relationships with outside data sources, placing liability and financial consequences for year 2000 compliant data squarely on a vendor's shoulders. That's hard to enforce, but the message must be clear that non-compliance will lead to an end in the rela-

tionship if alternatives exist. Managing the consequences of the year 2000 project is as much a key to a successful project as bringing it in on time. **CIO**

Thomas D. Oleson, a research director for IDC Research, can be reached at toleson@idcresearch.com.

Is Your Network Out of Line?

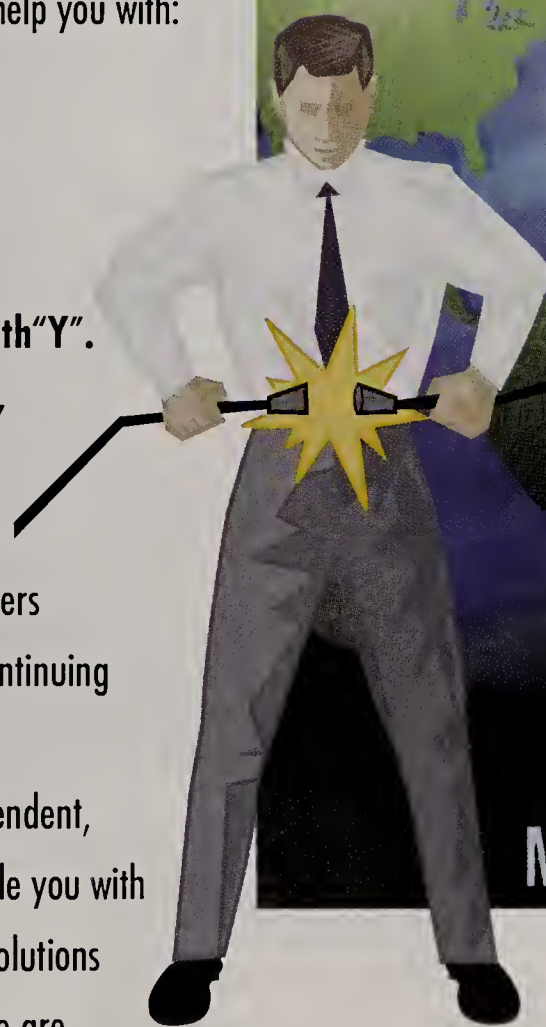
Everybody has a LAN, and most have a WAN. But hardly anyone is completely satisfied with their network's performance.

Since 1983 **CIBER Network Services, Inc. (CNSI)** has been helping corporate America install, upgrade and use a wide variety of networks. We're here to help you with:

- Old Topography.
- No Security.
- Internet Access.
- Remote Access.
- "X" doesn't work with "Y".
- Just plain, day-to-day, functionality.

Technology is anything but constant. Our customers are overwhelmed by a continuing barrage of new products.

CNSI works on an independent, non-biased basis to provide you with state-of-the-art, turnkey solutions and technical support. We are authorized vendors for Novell, Microsoft, CISCO, Raptor, US Robotix, HP, Compaq, Sun and more.



Please call any one of our four locations for information about our services and references.

San Francisco, CA
415-281-6000
Steve Kinstler

Denver, CO
303-433-4200
Lesley Taufer

Oakbrook, IL
630-620-1322
John Osterhout

Edison, NJ
908-225-1700
John Stubbs

CIBER

CNSI
CIBER Network
Services, Inc.

CIBER Network Services, Inc. is a subsidiary of CIBER, Inc.

For additional CIBER services, please contact us at 1-800-242-3799 or visit our web site at <http://www.ciber.com>

Emerging Technology

THE STATE OF THE ART,
NEW PRODUCTS
AND STAYING AHEAD
OF THE CURVE

Edited by Elaine M. Cummings

The Smallest Systems

Scoping out the future of palmtops in the enterprise

BY CURTIS F. FRANKLIN JR.

ITALIAN INVENTOR AND PRINTER ALDUS Manutius showed the world that information could be carried conveniently in book form when he founded the Aldine Press in 1490. Today, we have access to lots more information than Manutius did, but by most measures, the way we carry it hasn't changed all that much.

It's not that people haven't tried. Since the microprocessor came onto the scene in the 1970s, companies have adopted a number of solutions designed to make it easier to carry information to where it's needed most. No one believes that a current development is likely to remain state of the art for the next 500 years, but a system that provides an advantage for even the next three to five years could have a huge impact on the way we look at computing.

Take palmtop computing. One of the principal drivers behind today's renewed interest in handheld computers is the possibility of a true standard in hardware and software for these smallest of systems. Microsoft Corp.'s Windows CE and its attendant standard hardware requirements promise finally to allow enough of one particular type of palmtop computer to be sold to justify developing software interfaces and applications for it. Beyond simple market mass, though, Windows CE-based computers are likely to

change organizations through the applications they use, the communications infrastructures they build and the culture their members share.

The changes are likely whether an organization uses handheld devices as tools for running particular applications unique to the company's business or as general-purpose devices for dealing with a flood of information.

The Holy Grail of any electronic

device is acceptance in a general business environment. Most people don't realize that vertical applications—those built to respond to the needs of a particular industry—have been crucial to the success of palmtop computers for years. As long ago as 1994, officials at Sharp Electronics Corp. reported that more than half of all the Wizard units the company sold were delivered with a vertical-market application installed. Industries as diverse as health care and civil engineering saw those handheld units as useful information adjuncts to the standard toolkit of the profession.

Personal Effects

The handheld computer market can be broken into three segments: personal digital assistants (PDAs), personal companions and PC companions, according to Diana Hwang, a senior industry analyst with market researcher (and CIO's sister company) International Data Corp. in Framingham, Mass. "In the U.S. market, the PDA segment hasn't done well overall," says Hwang, citing high



IN THIS SECTION

E-Mail Management

Optical-Disk Storage

Network Security

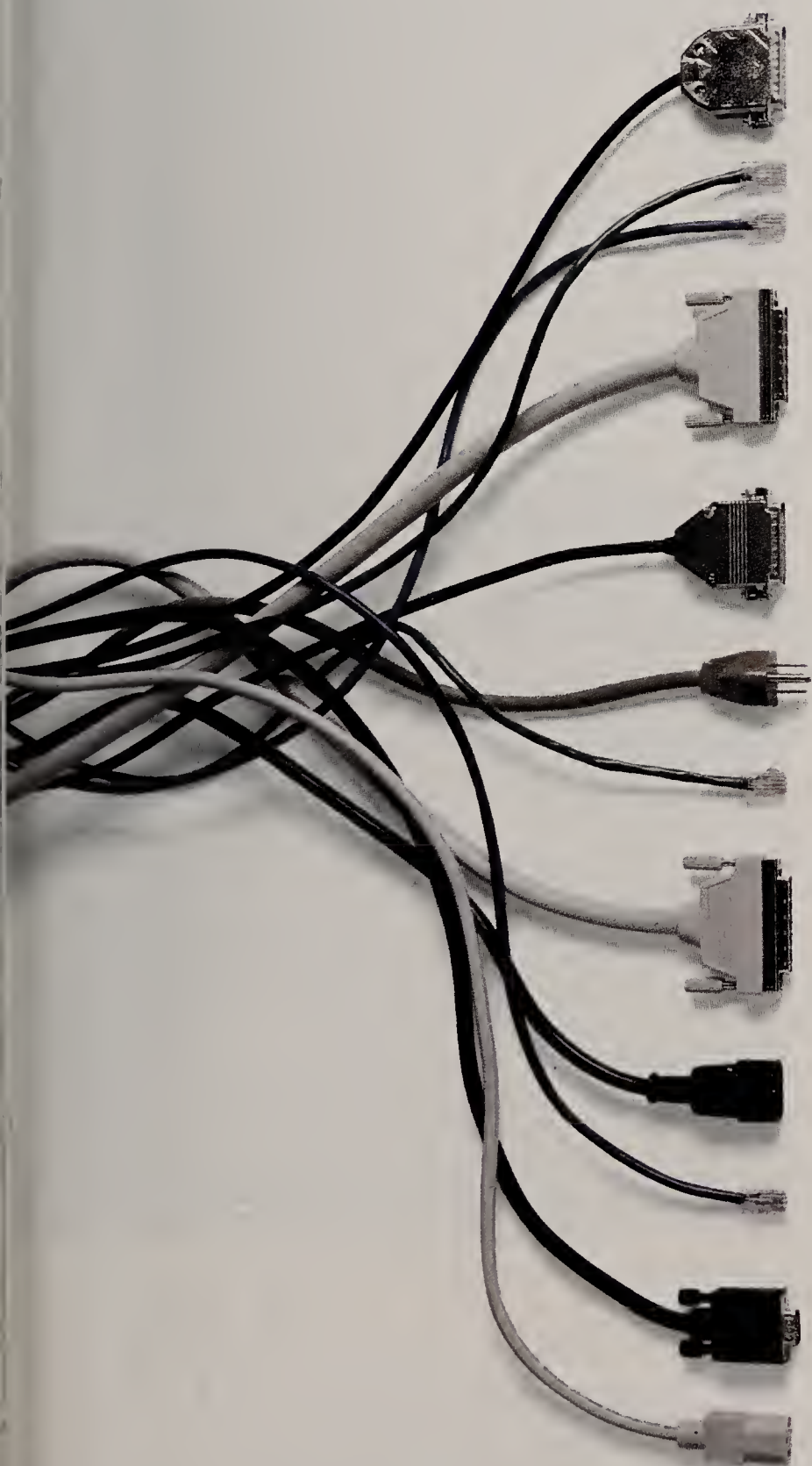
Remote Desktop Access



T H E N E W F A M I L Y

NT CLUSTER~IN~A~BOX

You can configure a lot of these, or you can just plug this.



Good choice!



Get the industry's first Microsoft Windows NT clustering solution packaged in a single, rack-mounted system. With Data General's NT Cluster-in-a-Box™ family of products, your company now has an NT clustering solution that will let you run your critical applications 24x7x365, in a system that you simply plug in and turn on. Our NT Cluster-in-a-Box includes:

- Two rackmounted AViiON® servers based on Intel Pentium® Pro processors
- A fault-tolerant CLARiiON® RAID storage system
- NTAAlertSM - the industry's only NT-based remote service for early identification of potential problems
- Pre-loaded Windows NT Server and FirstWatch for NT - failover software from Veritas Software
- Upgradable to Microsoft's forthcoming "Wolfpack" clustering technology.

Now, NT Cluster-in-a-Box is available in a family of three rackmount configurations to match your applications processing requirements: the entry-level AV 2100R, mid-range AV 3600R, and enterprise AV 6600R. All of these components, plus service, support, and integration, from one vendor. In one package. The choice is clear. Unless you want to spend a lot of time just plugging away.

 **Data General**

www.dg.com 1-800-DATA GEN.

Emerging Technology

price and imperfect handwriting recognition as factors working against the devices' success.

Typified by Apple Computer Inc.'s Newton, PDAs are handheld computers with a stylus or pen entry capable of communications, personal information storage and display, and forms-based data entry. Hwang says that class of device has experienced greater acceptance in the vertical market than in general business, although projections for the growth of the segment are lower than those for either personal companions or PC companions.

Personal companions account for the majority of the projected growth in the handheld market within the next three years. They encompass both the small electronic diaries from Casio, Sharp, Rolodex and others. Those systems are designed to track schedules and contact lists and keep short reminder messages. Hwang says the success of U.S. Robotics Corp.'s Pilot, which allows users to transmit data to their PCs with proprietary software, could mean several more manufacturers will enter the segment in 1997, with the line between personal companions and PDAs blurring slightly.

But it's the PC companion arena that is piquing the most curiosity in the current market. Dominated by devices such as the Hewlett-Packard Co. 200LX, the PC companion segment includes systems that do everything a personal companion does in addition to making data collection and entry easier. The ability to synchronize different types of data between desktop and palmtop is what excites most people about the new Windows CE entries in that segment, says Stefan Braken-Guelke, general manager of the PDA product line at Philips Semiconductors Inc. in Sunnyvale, Calif. "In the past, people buying [handheld computers] had no real possibility to transfer information from the desktop to the handheld and back again. A PC companion allows you to exchange data seamlessly between the two," he explains. Ease of transfer, which means no special skills or training are required, is the crucial difference for most potential users.

As Windows CE devices are accepted as part of the computing environment of an organization, applications will be adapted to the requirements of the sys-

tems. However, Windows CE devices have such dramatically different display resolutions and color ranges from desktop systems that developers are likely to

Message Madness

Is your company drowning in a sea of e-mail? Help is on the way.

AS MILLIONS SURF THE WORLD Wide Web, Web site operators are getting hit in the face with giant waves of e-mail. With more people sending messages to Web sites for answers to all sorts of questions, many organizations are finding themselves increasingly hard pressed to deliver timely, accurate responses.

Responding to visitors' questions is something like bailing the Atlantic with a teacup, says Bill McLain, the manager in charge of answering e-mail sent to Xerox Corp.'s Web site (www.xerox.com). "You never really catch up. The best you can do is keep pace," he says. McLain and his staff of three assistants answer the more than 300 questions that are sent to Xerox's site each day, up from about 30 per day in October 1996. "We try to reply to each message within 24 hours and generally are successful at meeting that goal," he says.

One way managers can deal with an ever-increasing flood of Web-site-generated e-mail is by using an application that streamlines message management. Email Valet, from Internet Outfitters of Santa Monica, Calif., allows webmasters and their assistants to categorize incoming messages and send an appropriate canned or semicanned response to each sender. The product also lets companies stockpile information on customer demographics, needs and interests. Companies need to look at Web-site-generated messages in a new light, says Chris Paine, Internet Outfitters' president. "Rather than as a burden, e-mail should be viewed as a

marketing tool that can alert a company to customer desires and trends," he says.

Another solution to e-mail overload is to outsource the whole mess to a call center. Matrixx Marketing Inc.'s CybeResponse service provides trained

E-MAIL MANAGEMENT

customer service representatives who will log into a company's e-mail system to answer Web-generated messages. The operators will read each message, review any previous correspondence from the sender and create a reply based on a combination of custom text and predefined responses. If unable to reply to a particular question, the representative will forward the e-mail to a relevant expert within the client's organization. Matrixx also offers a variety of database and reporting services.

Outsourcing can help a company cope with fluctuating e-mail volumes, says Elizabeth Stites, director of marketing for Cincinnati-based Matrixx. "Messages typically come in waves that are associated with product launches, promotional campaigns and other events," she says. "Outsourcing saves companies the burden of either adding extra workers or falling behind on answering e-mail during busy periods."

"But even the most sophisticated e-mail tools won't remove the bane of every webmaster: the stupid question," says Xerox's McLain.

—John Edwards



search for ways to limit the exposure of the CE to the rest of the infrastructure. The most promising technology for that is the Internet browser. Current versions

The SAS® Data Mining Solution

Discover the Diamonds in Your Data Warehouse



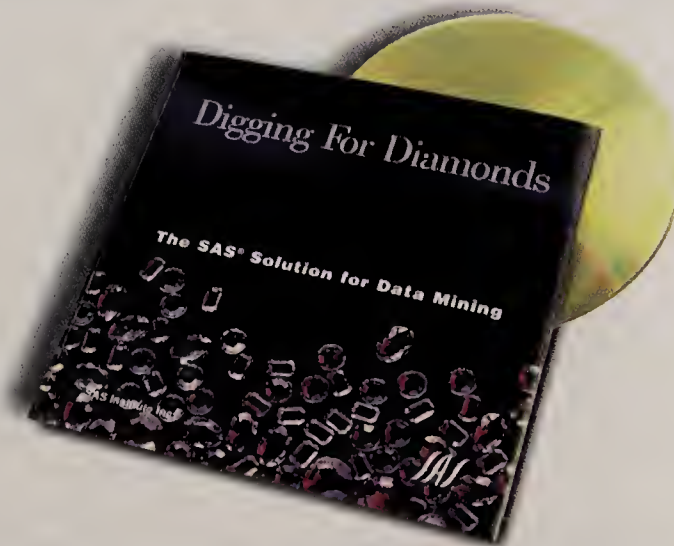
Introducing the first-ever, fully integrated data mining solution...one that maximizes your return on investment in data warehousing and data marts—as decision makers exploit your customer data for competitive advantage.

SAS Institute, for 20 years the leader in data discovery, provides the most complete and reliable data mining solution for modeling, measuring, and enhancing the profitability of your business. This Web-enabled, point-and-click approach lets you employ OLAP, neural networks, churn analysis, and many other visualization and analytical techniques to **improve customer retention, target key prospects, profile market segments, detect fraud, analyze customer response**, and much more.

Begin Your Discovery with our Free Web-Integrated CD ROM

Digging for Diamonds: The SAS® Solution for Data Mining lets you explore data mining from both a business and an IT perspective. And it's linked directly with our World Wide Web site, so you can continue to make new discoveries and gain fresh insights.

To request your copy, visit SAS Institute at www.sas.com/datamining/ or give us a call.



SAS Institute Inc.

The Business of Better Decision Making

E-mail: cio@sas.com

www.sas.com/datamining/

919.677.8200

In Canada 1.800.363.8397

SAS is a registered trademark of SAS Institute Inc. Copyright © 1997 by SAS Institute Inc.

Emerging Technology

of Windows CE come with a browser, even though the CE's access to local area networks has been limited. Browsers become the ideal companion for Windows CE and general or vertical applications because they understand the standard language of HTML, and programmers don't have to pay attention to the vagaries of operating systems on the workstation end of the client/server chain.

The Net Result

Perhaps the most difficult area in which to predict change is in IT infrastructure. Problematic even in the best of times, the subject of infrastructure is still more difficult in handheld computers because of the uncertainties surrounding their eventual use. Concerns about the impact of the systems on infrastructure center on network communications: What changes will networks undergo as the result of an onslaught of tiny computers?

To a certain extent, executives have been granted a reprieve in answering that potentially disruptive question. Microsoft decided to ship the first version of Windows CE without the embedded ability to connect directly to a network, limiting connectivity to remote dial-up links and wireless networks, including Ardis or RAM Mobile Data.

"There were things we wanted to do that had to be left for later releases," says Microsoft's Jim Floyd. "We have a number of customers that have talked to us about [network connectivity] and a number of card manufacturers that want to do the same thing. You can, however access your intranet through the browser." Floyd, the handheld PC product manager at the Redmond, Wash., company, points out that the reprieve is brief, however, because the company will add more complete network capabilities to future releases of Windows CE.

Whether the coming release will affect corporate networks depends largely on how people use the handheld computers. When any new tool becomes available, it brings with it the potential to change the way people work. Witness the impact of telephones, typewriters and personal computers or, in less dramatic ways, pocket calculators, cellular telephones and Post-it Notes. Whether the handheld computer will rank alongside the former or the latter group—or whether it will have any long-term effect—won't be known for some time. Windows CE devices could make e-mail even more ubiquitous, as people learn to take the application on small computers to meetings or remote locations. That people can be as completely connected electronically as they may be now through cellular telephones or that they can be productive constantly because they are never away from necessary tools requires no great leap of logic.

LEADING

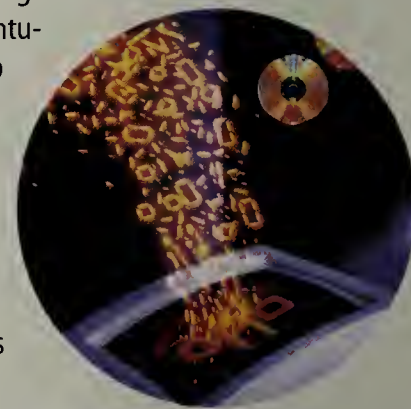
EDGE

Maximum Security

NEW FLASH. Fire engulfs records-management warehouse and destroys documents belonging to more than 200 companies. Film at 11. In this day of information importance, companies need to find ways to process, transfer and safely store their vital data. They store it for daily use, but they also have to archive it in a way that offers long-term security.

Most traditional polycarbonate CDs are susceptible to exposure to scratches, moisture, light and changes in temperature, which eventually can make them unreadable. Digipress, a French company in Caen, Normandy, has developed a new optical-disk technology that offers high-security archiving capabilities and low maintenance costs. The **Century-Disc** concept is simple: Information is etched directly into tempered glass. Century-Discs Gold uses a reflective layer of gold that is plated onto the glass, and in the Century-Discs Ark, the reflective layer is made up of titanium nitride instead of polycarbonate. Users can count on a single standard format from beginning to end of data's lifetime, saving the costs of data restructuring, recapturing or reindexing. The longevity of Century-Discs drastically cuts maintenance costs and expensive transfers from one medium to another.

For more information, contact Digipress via J.K. International Inc. of Norwalk, Conn., at 203 899-0671.



Hackers Beware!

FOR WINDOWS NT USERS, IT'S LIKE YOUR OWN PERSONAL pit bull terrier—minus the late-night walks in the park. Intrusion Detection Inc. of New York has released real-time network security monitoring software for Microsoft's Windows NT. The **Kane Security Monitor (KSM)** uses Shadoware technology to ward off any would-be intruders—from hackers to authorized users.

The KSM protects its turf like a 24-hour watchdog, guarding NT networks for suspicious activity such as excessive incorrect password attempts or efforts to invade an executive's desktop. Regardless of how subtle or obvious the security violations appear, the software immediately alerts company security officers of break-ins as they occur.

The KSM uses artificial intelligence to filter through security and audit data to create digital signature fingerprints of all network users. As time passes, the KSM creates a unique pattern for each user. The software can then recognize unusual activity and report it as necessary.

Some types of security break-ins that the KSM identifies include browsing, ghost IDs, password cracking, abuse of supervisor privileges, failed file-access attempts and excessive privilege granting to name a few. So if that hacker manages to scale a company's security firewall, the KSM is on the other side waiting.

For more information, call Intrusion Detection at 212 348-8900 or visit www.intrusion.com.

The world is moving to Windows NT. We'll take you there.

The Ohio Department of Transportation is transitioning their highway design and management operations to Windows NT using InterServe servers. Overcoming the connectivity challenges of this diverse system, Intergraph has helped bring engineering, e-mail, and office automation applications to former UNIX users. Cost-per-seat is lower and the learning curve shorter for both users and administrators.

As the financial industry moves toward electronic commerce and on-line banking, world leaders such as Emirates International Bank have chosen Intergraph hardware and interoperability solutions to support their Internet-based financial services.

The New Zealand police has introduced an Intergraph dispatch system on Windows NT servers and clients to serve more than 3.5 million people and handle more than 1.2 million calls each year in a mission-critical environment requiring highly robust systems. Application-level clustering of InterServe multiprocessor servers ensures 100% availability for this highly fault-tolerant system.



Intergraph's InterServe line of servers delivers the mission-critical performance you need on Windows NT.

No company understands Windows NT® like Intergraph Computer Systems. In 1993, we moved our entire 8,000-seat enterprise from UNIX to Windows NT. Today we're Windows NT top to bottom, helping customers deploy almost every type of application from databases to messaging. From New Zealand's police dispatch system serving 3.5 million people, to Ohio's Department of Transportation highway design and management, to Emirates International Bank's banking services, organizations worldwide are turning to Intergraph for Windows NT solutions.

Our InterServe™ line of Windows NT servers unleashes the power of Intel's 200 MHz Pentium® Pro processors. And based on the industry's most respected benchmarks, InterServe consistently dominates in server price/performance.

InterServe is part of Intergraph's total system solution including storage, site management, networking and interoperability tools. Intergraph also manufactures complete lines of 3D PCs and 3D graphics workstations. And we back every solution with our own award-winning service, support, and consulting.

So when you're ready to make the move to Windows NT, call the experts at 1-800-763-0242. Or reach us on the Internet at www.intergraph.com/ics.

INTERGRAPH
COMPUTER SYSTEMS



Intergraph and the Intergraph logo are registered trademarks and InterServe is a trademark of Intergraph Corporation. The Intel Inside logo and Pentium are registered trademarks and the Pentium Processor logo is a trademark of Intel Corporation. Windows NT is a registered trademark of Microsoft Corporation. Copyright 1997 Intergraph Corporation, Huntsville, AL 35894-0001. MC970026

Emerging Technology

Whether those changes are positive remains to be seen. For some individuals and organizations, the possibility of productive time away from a desk will raise stress levels without raising genuine productivity. For others, the ability to carry e-mail and information away from a desktop computer without the burden and clutter that often accompany even a laptop computer will let them make productive use of the time spent cooling heels outside meeting rooms or in those awkward interludes between meetings, when there is too much time to waste comfortably but not enough to make it back to the office.

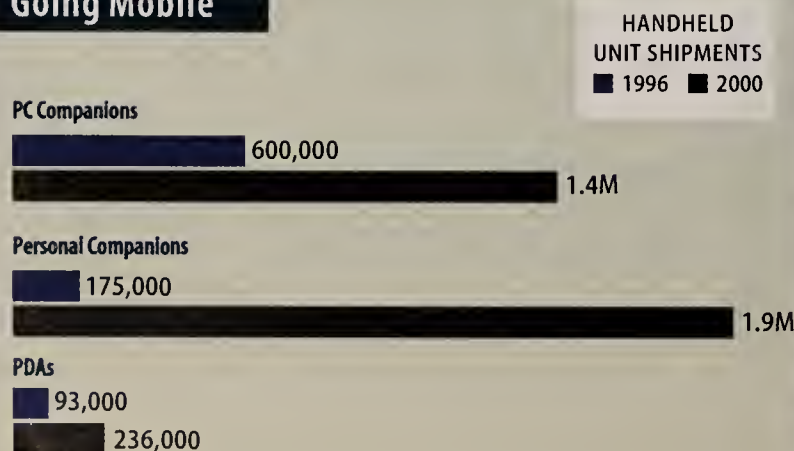
Cellular phones brought the idea of constant availability to the popular corporate imagination. Now, being out of touch passes for a perquisite in many organizations. Still, many people who are not strictly true mobile professionals are unable to work with e-mail when away from their desktop computers. The Windows CE devices provide users the ability to download e-mail from the desktop and then read, organize and respond to it while in situations where desktop or laptop computers are not appropriate.

The addition of a wireless network modem makes downloading and responding to e-mail in a cab or on a park bench a real (albeit rather pricey, at least at the moment) option. The concept of sending e-mail from a cab or being productive away from the office isn't news to those users who consider a laptop computer part of their ordinary professional toolkits. In bringing portability to those for whom it could not be justified at one time, palmtop computers provide the potential for a revolution. If even a small fraction of the hours wasted by those employees can be transmuted into productive time, the investment in all aspects of palmtop computers will be worthwhile.

On the Other Hand

But no matter how exciting the potential benefits of palmtop computers are, they should not be pursued without considering potential downside issues. The first looks at the question of application development. In the client/server environment, too many developers have learned to lean on color and graphics resolution to convey information. Neither is truly available for a Windows CE palmtop computer; yet many application development plans will need to include the possibility of such deployment on those computers.

Going Mobile



SOURCE: DATAQUEST INC.

LEADING

EDGE

Unlimited Access

WEB BROWSERS ARE FAST BECOMING the medium of choice for users looking to access information. So it's a good thing remote access to your desktop just got easier—and the price is right, too. Stac Inc. of San Diego has announced a free software solution that provides remote desktop control over any TCP/IP network connection, including the Internet or company intranet. **ReachOut Global** is a 32-bit Web browser add-on that gives users fast, flexible and familiar remote access via the Internet. With ReachOut Global, users can remotely control applications running on their Windows 3.1 or Windows 95 desktops using their browsers.



Available free of charge as an ActiveX Control for Microsoft Internet Explorer or as a plug-in for Netscape Navigator, ReachOut Global includes both the remote (viewer) and local (host) software for download and use. It can be downloaded from Stac's Web site at www.stac.com.

ReachOut Global users can also upgrade to ReachOut 7, an all-in-one solution that provides support for Web browsers, Windows NT, Windows 95, Windows 3.1 and DOS—for \$139. For product information, call 800 279-7822.

By encouraging the development shift to Web-enabled applications, Windows CE urges a company to develop on a platform not yet supported by the development or testing tools available to traditional client/server architectures. Forcing development in an environment that is not ready for prime time requires a risk-taking ability that exceeds the capacity of many companies.

For U.S. white-collar workers, embracing technology changes has become an essential part of the job description. For non-professionals and many employees of all types outside the United States, acceptance of new technology may require more training, both in direct use and in the general benefits to the individual and organization, than fast-moving IT organizations would like. If palmtops are to have a chance for success, the training and acculturation issues surrounding them cannot be ignored. As with so much technology development, the people side may turn out to be more important for success than any changes in the technology itself. **CIO**

Curtis F. Franklin Jr. is a freelance writer and director of Client/Server Labs in Atlanta. He can be reached via e-mail at cfranklin@cslinc.com.



Sure, you're going to the web. But just how are you planning to get there?



How long will it take and how many of your applications will survive the trip?



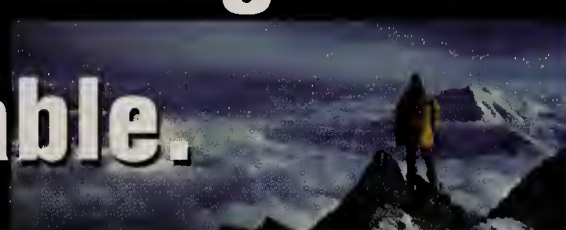
You think this is going to be easy? Only if you use

ForeSite.™



The ultimate software solution for systems migration

to the web. Powerful. Scalable.



Fluent in many languages. What are you waiting for? You're not even going to break a sweat on this trip.



centura™

Download a copy of ForeSite at www.centursoft.com/products/foresite.



BackOffice Family:

Windows NT Server

SQL Server

Exchange Server

Proxy Server

Site Server

Systems Management Server

SNA Server

Future Server

Did somebody say

Scala

Microsoft®



BackOffice™

Microsoft® BackOffice™ handles a terabyte of data

a hundred million Web site hits a day

1.8 million e-mails in 24 hours,

each on a single server.

It also handles a billion ATM transactions daily.

scalability?

And it delivers one of the highest throughput rates of any system ever tested.

All for as little as one-third the cost of UNIX-based systems.

We know it's a lot to absorb all at once.

So you may want to read it again.

Or visit www.microsoft.com/backoffice/scalability/

Where do you want to go today?® **Microsoft®**



I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

Actra Business Systems	70
Amazon.com Inc.	70
Ameritech Corp.	58
Anthem Inc.	44
Apple Computer Inc.	98
Aurora Health Care	58
Bandai Co.	20
Bauer Group Inc., The	42, 44
Bay Networks Inc.	70
BJC Health System	58
Brookwood Medical Center	44
Capability's Books Inc.	70
Care Management Science Corp.	44
CJ Singer	58
Columbia/HCA Healthcare Corp.	58
CrossZ Software	44
Data Warehousing Institute, The	44
Davis & Neusch Inc.	30
Deloitte & Touche Consulting Group	30, 44
Digipress	98
Federal Express Corp.	70
Furst Group/Management Partners Inc.	20
Garden Escape Inc.	70
GE Information Services	70
GE Lighting	70
Georgia Institute of Technology	20
Gordon & Glickson PC	58
Halbrecht Lieberman Associates Inc.	30
Health Resources Group	44
HealthShare Technology Inc.	44
Hewlett-Packard Co.	98
i2 Technologies Inc.	70
IBM Corp. Consulting Group	34
Information Technology Association of America	20
Intermountain Health Care	44
International Data Corp.	92, 98
Internet Outfitters	98
Intrusion Detection Inc.	98
J.K. International Inc.	98
LittleNet LLC	70
Matrixx Marketing Inc.	98
Med-AI Inc.	44
Medical College of Georgia	20
Medical Information Technology Inc.	58
Medstat Group, The	44
Memorial Sloan-Kettering Cancer Center	58
Microsoft Corp.	98
National Committee for Quality Assurance	44
Office Athlete LLC	20

Olsen Health Services	44
Oxford Health Plans	44
Penn Mutual Life Insurance Co.	110
Philips Semiconductors Inc.	98
SAS Institute Inc.	44
Seattle Times Co., The	30
Sentara Health System	20, 44
Seventh-Day Adventist Church	20
Sharp Electronics Corp.	98
Simon & Schuster	70
Software Services International Inc.	42, 44
Software Support Professionals Association	20
Stac Inc.	98
State University of New York's Health Science Center at Syracuse	44
TouchStone Software Corp.	20
Unibex Inc.	70
University of North Carolina at Chapel Hill School of Medicine	44
U.S. Robotics Corp.	98
Walt Disney Co., The	20
Wisconsin Health Information Network	58
Xerox Corp.	98

Advertiser Index

Alltel Enterprise Network Service	31
Amdahl Corp.	85
Bay Networks Inc.	11
BDM International Inc.	89
Bellcore	4
Cabletron Systems Inc.	C4
Centura Software Corp.	105
Ciber Consulting Inc.	97
CiMatrix	83
CIO Communications Inc.	21, 37, 72A
Cisco Systems Inc.	18
Compaq Computer Corp.	24
Computer Associates International Inc.	3
Compuware Corp.	93
Data General Corp.	99
Datakey Inc.	65
EMC Corp.	49
Encore Computer Corp.	61
Hewlett-Packard Co.	12, 15, 56
IBM Corp.	C2, 38
Information Builders Inc.	17
InPower Inc.	27
Intergraph Corp.	103
Microsoft Corp.	20A, 86, 106
Norand Corp.	77
Northern Telecom	63
OneSource Information Services Inc.	95
Oracle Corp.	7
Peritus Software Services Inc.	9
PKS Information Services Inc.	29
Rational Software Corp.	91
SAS Institute Inc.	23, 101
Siebel Systems Inc.	73
Standard Microsystems Corp.	109
Sun Microsystems Inc.	C3, 51, 53, 55
Symbios Logic Inc.	67
Tandem Computers Inc.	68
Xerox Corp.	79

CIO is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 275 computer publications in over 75 countries. Sixty million people read one or more International Data Group publications each month. International Data Group's publications include: **Argentina:** Buyer's Guide, Computerworld Argentina, PC World Argentina; **Australia:** Australian Macworld, Australian PC World, Australian Reseller News, Computerworld, IT Casebook, Network World, Publish, Webmaster; **Austria:** Computerwelt Österreich, Networks Austria, PC Tip Austria; **Bangladesh:** PC World Bangladesh; **Belarus:** PC World Belarus; **Belgium:** Data News; **Brazil:** Anuário de Informática, Computerworld, Connections, Macworld, PC Player, PC World, Publish, Reseller News, Supergamepower; **Bulgaria:** Computerworld Bulgaria, Network World Bulgaria, PC & MacWorld Bulgaria; **Canada:** CIO Canada, Client/Server World, ComputerWorld Canada, InfoWorld Canada, NetworkWorld Canada, WebWorld; **Chile:** Computerworld Chile, PC World Chile; **Colombia:** Computerworld Colombia, PC World Colombia; **Costa Rica:** PC World Centro America; **The Czech and Slovak Republics:** Computerworld Czechoslovakia, Macworld Czech Republic, PC World Czechoslovakia; **Denmark:** Communications World Denmark, Computerworld Denmark, Macworld Denmark, PC World Denmark, Techworld Denmark; **Dominican Republic:** PC World Republica Dominicana; **Ecuador:** PC World Ecuador; **Egypt:** Computerworld Middle East, PC World Middle East; **El Salvador:** PC World Centro America; **Finland:** MikroPC, Tietoverkko, Tietoviikko; **France:** Distributique, Hebdo, Info PC, Le Monde Informatique, Macworld, Reseaux & Telecoms, WebMaster France; **Germany:** Computer Partner, Computerwoche, Computerwoche Extra, Computerwoche FOCUS, Global Online, Macwelt, PC Welt; **Greece:** Amiga Computing, GamePro Greece, Multimedia World; **Guatemala:** PC World Centro America; **Honduras:** PC World Centro America; **Hong Kong:** Computerworld Hong Kong, PC World Hong Kong, Publish in Asia; **Hungary:** ABCD CD-ROM, Computerworld Szamistechnika, Internetto Online Magazine, PC World Hungary, PC-X Magazin Hungary; **Iceland:** Tolvheimur PC World Island; **India:** Information Communications World, Information Systems Computerworld, PC World India, Publish in Asia; **Indonesia:** InfoKomputer PC World, Komputek Computerworld, Publish in Asia; **Ireland:** ComputerScope, PC Live; **Israel:** Macworld Israel, People & Computers/Computerworld; **Italy:** Computerworld Italia, Macworld Italia, Networking Italia, PC World Italia; **Japan:** DTP World, Macworld Japan, Nikkei Personal Computing, OS/2 World Japan, SunWorld Japan, Windows NT World, Windows World Japan; **Kenya:** PC World East African; **Korea:** Hi-Tech Information, Macworld Korea, PC World Korea; **Macedonia:** PC World Macedonia; **Malaysia:** Computerworld Malaysia, PC World Malaysia, Publish in Asia; **Malta:** PC World Malta; **Mexico:** Computerworld Mexico, PC World Mexico; **Myanmar:** PC World Myanmar; **Netherlands:** Computer! Totaal, LAN Internetworking Magazine, LAN World Buyers Guide, Net, Macworld Netherlands, WebWereld; **New Zealand:** Absolute Beginners Guide and Plain & Simple Series, Computer Buyer, Computer Industry Directory, Computerworld New Zealand, MTB, Network World, PC World New Zealand; **Nicaragua:** PC World Centro America; **Norway:** Computerworld Norge, CW Rapport, Datamagasinet, Financial Rapport, Kursguide Norge, Macworld Norge, Multimediaworld World Norway, PC World Ekspress Norge, PC World Nettverk, PC World Norge, PC World ProduktGuide Norge; **Pakistan:** Computerworld Pakistan; **Panama:** PC World Panama; **People's Republic of China:** China Computer Users, China Computerworld, China InfoWorld, China Telecom World Weekly, Computer & Communication, Electronic Design China, Electronics Today, Electronics Weekly, Game Software, PC World China, Popular Computer Week, Software Weekly, Software World, Telecom World; **Peru:** Computerworld Peru, PC World Profesional Peru, PC World SoHo Peru; **Philippines:** Click!, Computerworld Philippines, PC World Philippines, Publish in Asia; **Poland:** Computerworld Poland, Computerworld Special Report Poland, Cyber, Macworld Poland, Network World Poland, PC World Komputer; **Portugal:** Cerebro/PC World, Computerworld/Correio Informático, Dealer World Portugal, Mac*In/PC*In Portugal, Multimedia World; **Puerto Rico:** PC World Puerto Rico; **Romania:** Computerworld Romania, PC World Romania, Telecom Romania; **Russia:** Computerworld Russia, Mir PK, Publish, Seti; **Singapore:** Computerworld Singapore, PC World Singapore, Publish in Asia; **Slovenia:** Monitor; **South Africa:** Computing SA, Network World SA, Software World SA; **Spain:** Comunicaciones World España, Computerworld España, Dealer World España, Macworld España, PC World España; **Sri Lanka:** Infolink PC World; **Sweden:** CAP&Design, Computer Sweden, Corporate Computing Sweden, Internetwork Sweden, it.branschen, Macworld Sweden, MaxiData Sweden, MikroDatorn, Nätverk & Kommunikation, PC World Sweden, PC/Aktiv, Windows World Sweden; **Switzerland:** Computerworld Schweiz, Macworld Schweiz, PCtip; **Taiwan:** Computerworld Taiwan, Macworld Taiwan, NEW VISION/Publish, PC World Taiwan, Windows World Taiwan; **Thailand:** Publish in Asia, Thai Computerworld; **Turkey:** Computerworld Türkiye, Macworld Türkiye, Network World Türkiye, PC World Türkiye; **Ukraine:** Computerworld Kiev, Multimedia World Ukraine, PC World Ukraine; **United Kingdom:** Acorn User UK, Amiga Action UK, Amiga Computing UK, Apple Talk UK, Computing, Macworld, Parents and Computers UK, PC Advisor, PC Home, PSX Pro, The WEB; **United States:** Cable in the Classroom, CIO Magazine, Computerworld, DOS World, Federal Computer Week, GamePro Magazine, InfoWorld, I-Way, Macworld, Network World, PC Games, PC World, Publish, Video Event, THE WEB Magazine, and WebMaster; online webzines JavaWorld, NetscapeWorld, and SunWorld Online; **Uruguay:** InfoWorld Uruguay; **Venezuela:** Computerworld Venezuela, PC World Venezuela; and **Vietnam:** PC World Vietnam.

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-0080. **Postal Information:** CIO (ISSN 0894-9301) is published semimonthly; monthly in July and August; and as a combined issue December 15/January 1 by CIO Communications Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Periodicals postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1997 by CIO Communications Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Department, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: **Ⓢ**. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208; 800 788-4605. CIO is free to qualified information executives. To all others the one-year basic rate is \$98 for U.S. and Canada, \$110 to foreign countries (payable in U.S. funds only). The single copy price is \$8. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 879-7899. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.



**10 Mbps switching
to the desktop
sounds like a great
investment.**

**Until you need
11 Mbps, that is.**

Fast Ethernet solutions from SMC.

When expanding your network, you need to plan for the long term. Yet 10 Mbps solutions are at best a stopgap fix.

The fact is, a few users simultaneously accessing standard office applications can drain all the bandwidth in a 10 Mbps network. Toss in today's database, client/server, and Internet access applications and 10 Mbps switching to the desktop won't hold water for very long.

That's why SMC has made a strategic commitment to 100 Mbps Fast Ethernet technology—and backed it up with leading-edge solutions from end to end.

Including our new EtherPower™ II 10/100



network cards with the best price/performance and fastest installation in the industry. Our

SwitchReady™

TigerStack™ 100 stackable hubs let you integrate 100 Mbps technology into your 10 Mbps LAN. Our TigerSwitch™ 100 Fast Ethernet switch, which provides all the bandwidth you'll need for years to come. And a Customer Satisfaction Guarantee that offers the industry's strongest technical support, before and after the sale.

Looking to expand your network while protecting your investment?

Consider a plan that's watertight: Fast Ethernet solutions from SMC.

SMC®
Connect With Us.

**Call today to see if you qualify for SMC's
Fast Ethernet Product Evaluation Program*
for EtherPower II 10/100, TigerStack 100,
and TigerSwitch 100 products.**

**1-800-SMC-4-YOU, Dept. FPE Program
(press option 1, then 5)
www.smc.com**

*Program is subject to additional terms and conditions, is valid in the US only, and is available only to prospects qualified by SMC in its sole discretion. Program is subject to change or cancellation by SMC without notice. Limited supply only. Not available to resellers, distributors or Federal agencies.

©Copyright 1997 Standard Microsystems Corporation

ShopTalk

Edited by Sara Shay

Penn Mutual's Susan Kozik on Enterprisewide Customer Service

CIO: What's so new about customer service in IS? Haven't they always provided service?

Technology has become incredibly complex, and of course nobody understands it all. Unfortunately, most systems people wait to react to technology problems rather than anticipate them. Then they say to users, "Tell us your problem, and we'll fix it."

But the users—the IS customers—shouldn't have to diagnose their own problems. IS puts these technologies together, and they should be accountable for making sure they're as robust and functional as they says they are.

How does it usually work?

Many IS departments create specialized areas—a database team, a mainframe team, a network team—that provide specialized support. Then IS trains technicians to troubleshoot. They end up providing service in a reactive, firefighting manner instead of using a methodical, consistent process for expecting and managing problems.

How can IS change its approach?

Think of customer service as you would your automobile.



Spotlight On:

Susan Kozik, vice president and chief technology officer, Penn Mutual Life Insurance Co., Horsham, Pa.

- **Line of Business** Life insurance and annuities
- **Bio** Joined Penn Mutual in April 1997; worked with Cigna Corp. for 18 years, most recently as vice president of Cigna Technology Services
- **Day to Day** Oversees all of IT and is a key member of the executive staff setting business direction
- **Challenges** Develop technology strategies to assist in product differentiation in the marketplace

When it breaks down, you want to take it to one garage to decide whether the problem is with the spark plugs or the ignition. In my organization, I don't want the users to have to "look under the hood." I want them to have access to the experts all at the same time.

To do that, I would pinpoint 100 or so things for which the entire systems organization is accountable—without giving users 100 or so places to get service. By managing IS services horizontally and not vertically, you provide one-stop shopping via an enterprisewide help desk to enable users to become more productive.

How do you make one-stop shopping possible?

Hire senior technicians who know how products work together and can diagnose a problem, not just deal with the symptoms. Train them in customer service. Give them the ability through other monitoring devices to

understand what's happening in the enterprise. Finally, teach technicians what a day in the life of a user is like because a lot of technicians have lost a sense of how people use technology outside the IS lab. If technicians have the opportunity to visit field offices or see users at work, they find out how people really use technology and usually come back with a lot of "aha's!"

But what if the problem isn't the fault of IS?

Sometimes IS gets a call because they're not doing sufficient training. Sometimes they get called because users aren't attending the training or haven't read the manuals, and it's easier to call. Sometimes IS thinks the application is self-sufficient and intuitive and, gee, it isn't. But even if the problem is not something IS could have affected, they're still accountable for the effective use of the product. That motivates them to get it right the first time and understand when they put out a new release that they're responsible for it.

Do you need to support every product?

The religious wars around products are fairly extensive. IS has to be clear upfront about which products they support and which ones they don't. If they decide they are not in the business of supporting certain products, they need to let users know so users can arrange service with the vendor themselves.

How do you know when to outsource IS?

Having a customer service process does not preclude outsourcing or partnering with a vendor. You have to decide what business you're in first and then define the level and price of a particular service. Who you choose to provide that service is up to you. But if you don't know what you're trying to do, who you do it with is a moot point.

—Elaine M. Cummings

Network software that's well-designed, well-implemented and well-reviewed.

**"Best enterprise management
software of 1996."**

*– Infoworld praises Solstice™ Enterprise Manager™ software**

**"Solaris is a highly scalable, powerful and flexible
OS well suited to general Internet
service and enterprisewide intranet services."**

– Network Computing raves about Sun™ Solaris™ operating environment†

**"Many new Java™ development tools were released
this year, but none as radical as Sun's Java™ Workshop.™"**

– PC Magazine honors Java WorkShop Software‡

And there's a whole lot more where that came from.
To see for yourself, visit our website or give us a call.

Develop, deploy and manage with Sun™ Workshop,™ Solaris, and Solstice™ Software.

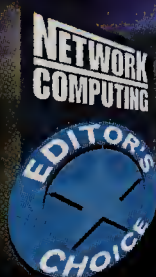
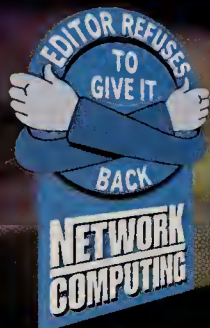
www.sun.com/sunsoft/reviews/ or contact 1-800-SUNSOFT (786-7638)



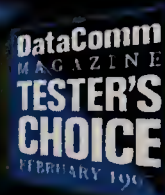
THE NETWORK IS THE COMPUTER™

Remember the pride that came with passing the toughest tests? We do.

McConnell Consulting
"...full scores for scalable routing,
VLAN management and multiple backbone support..."



Smart



Scott Bradner/Harvard Test Lab
"...the fastest internetworking device I have seen."

Award-winning solutions from Cabletron. A simpler way to work.



At Cabletron, we're proud of what others are saying about us . . .

- *Network Computing* recognized Cabletron's SmartSwitches with its "Editor's Choice" and "Editor Refuses to Give it Back" awards based on industry-leading speed and ease-of-use.
- In a lab test among leading switches, *Communications Week* gave the SmartSwitches its "Max Award" proclaiming Cabletron "...the only vendor to have fully implemented the use of policy-based VLANs."
- After a study conducted by the Harvard Network Device Test Lab, Scott Bradner remarked that the Fast Ethernet SmartSwitch was "...the fastest internetworking device I have yet seen."
- And in another test of leading Ethernet and Fast Ethernet solutions, the Tolly Group concluded that the SmartSwitch out-performed the competition in VLAN and RMON support.
- Cabletron scored highest in VLAN management in McConnell Consulting's "VLANs: Head-to-Head," and tied for first in two of three other categories between 12 leading vendors.
- During the Switching Showdown at Comnet '97, Cabletron garnered over 50% of the vote in a *Network World* audience poll.
- For the second year in a row, *Network Magazine* (formerly *LAN Magazine*) awarded Cabletron's SPECTRUM enterprise management solution its 1997 Product of the Year in the category of Management Platform.
- In WAN switching, Cabletron's FRX4000 frame relay solution from CSI Netlink won the annual "Tester's Choice" award handed out by *Data Communications*.

Cabletron's award-winning team is proud of the recognition it has earned from pundits and publications alike. And if our solutions excel in a closely-watched lab environment, imagine how they perform in customers' real-world business networks. We're simply honored about passing that test.

Call 603-337-0930 for more information or visit us on the Web at www.cabletron.com.

CABLETRON

SYSTEMS

The Complete Networking Solution™